

## **Equity in Response to Climate Change Round table**

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### **EQUITY AND CLIMATE CHANGE – UK AND EU EXPERIENCE**

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#### **Introduction**

Whilst there is scientific consensus that climate change is real and that human activities are a major factor, issues of climate justice or equity are most commonly discussed as a developed versus developing world issue. The developed industrialised nations are seen as responsible for most emissions, but it is developing countries that are likely to experience the worst effects of climate change due to a combination of situation (e.g. in areas most vulnerable to drought or flooding) and lack of economic resources to adapt. (e.g. Claussen and McNeilly, 1998; Christian Aid, 2000; Munasinghe, 2000)

However, there has been growing realisation that within developed countries the effects of climate change may not be equal. (e.g. Meyer and Hildyard, 1997) The Intergovernmental Panel on Climate Change (IPCC) has recognised this: “The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water and other resources.” (IPCC, 2001) The equity implications are also spelt out in this quote from the UK’s Secretary of State for the Environment : ”Socially, climate change raises profound questions of justice and equity: between generations, between the developing and developed worlds; between rich and poor within each country. The challenge is to find an equitable distribution of responsibilities and rights.” (Miliband, 2006a)

This therefore suggests that policy responses to tackle climate change need to take account of equity issues in both the development of domestic policy as well as international policy. Unless they do there is a risk that policies may have undesirable distributional impacts. At the same time, does the imperative to tackle climate change open up new opportunities to better deliver social justice, through policy responses ? For example, many problems facing low income and marginal households and communities today are not currently caused by climate change – e.g. fuel poverty (poor housing standards and low incomes); declining incomes for some small farmers (due to economic changes, more imports, agricultural policies etc). Some policies that could help to reduce greenhouse gas emissions (e.g. energy efficiency for the fuel

poor, decentralised energy production on farm land) might provide real short term social justice benefits and not just mitigate medium and long term climate change impacts on these groups.

The key areas covered in this paper are :

1. The effects of climate change in Europe and the UK and the extent to which low income, vulnerable or marginal communities will be more adversely or positively affected than others.
2. Some current and projected policy responses to climate change in the UK and their effects on low income households.

### **Climate change in Europe**

The European Environment Agency has assessed the impacts of climate change within Europe (EEA, 2004) Global average temperature has increased by about 0.7 °C and the European average temperature by 0.95 °C in the last hundred years. It is estimated that temperatures will further increase by 1.4–5.8 °C globally and 2.0–6.3 °C in Europe by the year 2100. Temperatures in winter have increased more than in summer.

However, changes in climate are not uniform across Europe. The warming has been greatest in northwest Russia and the Iberian Peninsula. Whilst central and northern Europe have received more rain than in the past, southern and south-eastern Europe have become drier. These changes are projected to continue with an impact on water availability. In addition, extreme weather events, such as droughts, heatwaves and floods, have increased while cold extremes (frost days) have decreased.

The effects on agriculture also vary within Europe. Climate change increased the length of the growing season by 10 days between 1962 and 1995, whilst rising temperatures increased water demand. During the heatwave in 2003, many southern European countries suffered drops in yield of up to 30%, while some northern European countries profited from higher temperatures and lower rainfall. Agriculture in mid and northern Europe, could benefit from rising temperatures, but in some parts of southern Europe, agriculture will be threatened due to increased water stress. There could thus be a northward shift of agriculture. Bad harvests could become more common anywhere in Europe however, due to an increase in the frequency of extreme weather events (droughts, floods, storms), pests and diseases.

Some key facts from the EEA's most recent set of indicators are :

- One of the most identifiable visual impacts of climate change in Europe is the retreat of glaciers. From 1850 to 1980, glaciers in the European Alps lost approximately one third of their area and one half of their mass, a trend that is continuing.
- In Europe, the average number of annual disastrous weather and climate related events doubled over the 1990s compared with the previous decade. Economic losses resulting from these events have increased significantly during the past 20 years, from an annual average of less than US\$5 billion to

about US\$ 11 billion. This is due to increased wealth and more frequent events. Four out of the five years with the largest economic losses have occurred since 1997. Climate change projections show an increasing likelihood of extreme weather events, so an escalation in damage caused is likely.

- More than 20 000 excess deaths attributable to heat, particularly among the elderly population, occurred in western and southern Europe during the summer of 2003. Heatwaves are projected to become more frequent and more intense, hence the number of excess deaths due to heat is projected to increase. On the other hand, fewer cold spells could reduce the number of excess deaths in winter.
- Between 1975 and 2001, the annual number of flood events increased and the number of people affected by floods rose significantly. However, fatal casualties caused per flood event decreased significantly, likely due to improved warning and rescue measures.
- There has been an increase in tick borne diseases - such as tick-borne encephalitis (TBE) and Lyme disease (in Europe called Lyme borreliosis)- in Europe, that may be attributable to climate change. TBE cases increased in the Baltic region and central Europe between 1980 and 1995 and remain high. However, it is not clear how many of the 85 000 cases of Lyme borreliosis reported annually in Europe are due to temperature increases.

“Climate change in the European Alps” (OECD, 2007) provides an assessment of the impacts of, and adaptation to, climate change in the areas of winter tourism in the European Alps. The years 1994, 2000, 2002, 2003 have been the warmest on record in the Alps in the past 500 years. Under present climate conditions, 609 out of the 666 (91%) Alpine ski areas in Austria, France, Germany, Italy, and Switzerland can be considered as naturally snow-reliable. The number of naturally snow-reliable areas would drop to 500 under 1 °C, to 404 under 2 °C, and to 202 under a 4 °C warming of climate. There will also be “winners” and “losers”, both in terms of regions and the ski areas themselves, with low-lying ski areas being considerably more vulnerable than areas with high altitudinal range. Thus “...climate change impacts have significant equity implications.” Smaller resorts, which tend to be at low altitudes are both more vulnerable to climate change and have fewer resources for expensive adaptations. Meanwhile, ski conglomerates have lower climate risk (as their ski areas often have greater altitudinal range), better diversification of risk (as they operate a number of resorts), and more resources to make adaptation.

The report summary points out “The implications of this assessment however extend beyond the European Alps. Insights into the costs of adaptation, the roles of the private sector and government agencies, and broader lessons on the synergies and trade-offs between climate change adaptation and other sectoral and development priorities are also likely to be relevant for other mountain systems which face similar climatic and contextual challenges, for example in North America, Australia and New Zealand.”

## Climate change in the UK

The UK has some data extending back three and a half centuries so this provides a long term picture of changes in climate. Central England's temperature rose by almost 1°C during the twentieth century and the 1990s was the warmest decade since records began in the 1660s. This warming of climate over land has been accompanied by warming of UK coastal waters. Analysis of other climate data has revealed the following changes:

- the growing season for plants in central England has lengthened by about one month since 1900 ;
- heatwaves have become more frequent in summer, while there are now fewer frosts and winter cold spells;
- winters over the last 200 years have become wetter relative to summers throughout the UK;
- a larger proportion of winter precipitation now falls on heavy rainfall days than 50 years ago;
- after adjusting for natural land movements, average sea level around the UK is now about 10 cm higher than it was in 1900.

(UKCIP, 2002)

This Climate Impacts Programme provides four alternative scenarios of how climate change may affect UK climate over the next hundred years. Some of the key results are :

- By the 2080s, annual temperature across the UK may rise by between 2°C and 3.5°C depending upon scenario. There will be greater warming in the south and east than in the north and west, and there may be greater warming in summer and autumn than in winter and spring. By the 2080s parts of the southeast may be up to 5°C warmer in summer. The temperature of UK coastal waters will also increase, although not as rapidly as over land.
- A very hot August, such as experienced in 1995 when temperatures over central England averaged 3.4°C above normal, may occur one year in five by the 2050s and three years in five by the 2080s.
- In the High Emissions scenario, in the south and east of the UK, summer precipitation may decrease by 50 per cent or more by the 2080s and winter precipitation may increase by up to 30 per cent.
- Relative sea level will continue to rise around most of the UK's shoreline. By the 2080s, sea level may be between 26 and 86 cm above the current level in southeast England. For some east coast locations, extreme sea levels could occur between 10 and 20 times more frequently by the 2080s than they do now.

A Department of Health (DoH) expert group used the then most recent (1998) UKCIP scenarios as the basis of a national assessment of the potential UK health impacts of climate change. (DoH, 2002) It identified a number of potential health impacts by the 2050s including:

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- Heat-related deaths could increase to around 2,800 cases per year. However, milder winters could lead to a fall in cold related winter deaths of up to 20,000 cases per year.
- There could be an increased frequency of severe coastal and river floods. Analysis of recent river flooding in the UK shows that mental health problems are the most important health impact among flood victims due to experience of personal and economic loss and stress. (Tapsell, 2002)
- Levels of UV radiation reaching the earth's surface may increase due to sunnier summers, a decline in cloud cover and ozone depletion. Whether this will lead to increased UV exposure depends on people's behaviour. Overall, the DoH assessment predicted an extra 5,000 cases of skin cancer and 2,000 cataracts per year by 2050.
- Higher temperatures in summer could cause an estimated 10,000 extra cases of salmonella infection per year.
- Climate change might increase levels of cryptosporidium and campylobacter in water. Secure sanitation systems should safeguard supplies of drinking water, but possible contamination of stormwater outflows could carry disease into basements and rivers, affecting the health of residents and river users.
- A reduction in cold, calm winter weather together with reduced emissions of key pollutants (including particles, oxides of nitrogen and sulphur dioxide) could lead to a reduction (up to 50%) in winter air pollution and its adverse health effects. A small overall increase in the number of summer ozone episodes coupled with a longer-term increase in background levels of ozone could cause a rise in the number of premature deaths.

Heatwaves can cause deaths among the elderly (over 75), the young (under 4) or those who are already ill. The heatwave in August 2003 is estimated to have caused 15,000 extra deaths in Northern France and around 2,000 extra deaths in England and Wales, mainly among older people. (POST, 2004) In response to concerns that climate change will increase the frequency of heatwaves, the DoH and NHS published a *Heatwave Plan for England* in July 2004. The plan defines four levels of response that are triggered when threshold temperatures are forecast or exceeded. It also lays down areas of responsibility for the Health Protection Agency, Met Office, DoH, Strategic Health Authorities, Primary Care Trusts, Local Authorities and Regional Directors of Public Health.

The UK national assessment of the likely health impacts of climate change identified areas where more research is needed including :

- research into the vulnerability of individuals and groups;
- assessment of the effectiveness of education campaigns such as Sun Safe in changing people's behaviour;
- assessment of the effectiveness of adaptation policies such as warning schemes;
- better estimates of likely impacts of climate change on human health;
- how best to communicate remaining uncertainties to policy makers and the public.

It is likely that many of the climate change impacts outlined above would affect lower income people more than the better off. For example, better off households are more likely to respond to education campaigns to change behaviour, take up vaccinations, use sun screen (which can be expensive). Evidence for this comes from reviews of access and response to health education, screening and vaccination services - minority groups and those with lower socio-economic status generally have poorer access to these services or do not take them up as much as better off groups. The reasons why this is so are complex but include cost issues (e.g. to travel to access screening), language difficulties (for some minority groups) etc. Low income households are less likely to have comprehensive household insurance to cover them for damage – and this problem is likely to worsen as premiums rise for people living in areas prone to flood damage (for example). There would be a need for special outreach and policies targeted to low income, vulnerable and marginal people.

### **UK energy policy response to climate change**

As the above account shows, climate change is having some short and medium term equity implications within Europe and the UK, but many of its impacts will be felt in the longer term. However, policies that are developed to mitigate climate change may have more of an impact in the short term as the costs and benefits of such policies are likely to be felt much more immediately.

The UK has been developing policy responses to climate change since the early 1990s. The UK's target under the Kyoto protocol is to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008-12 and it should achieve this. The UK has also set itself the more challenging target of a 20% reduction by 2010 – on current trends it is less likely to achieve this. The longer term aspiration is a 60% reduction by 2050. This aspiration is now likely to be enshrined in legislation under proposals in the draft Climate Change Bill, published for consultation on 13 March.

Climate change policies sit within broader UK energy policy, which has four long-term goals.

- To put the UK on a path to cut carbon dioxide emissions by 60% by 2050, with real progress by 2020
- To maintain reliable energy supplies
- To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve productivity
- To ensure that every home is adequately and affordably heated.

(DTI, 2006)

The fourth of those goals arises due to the recognition of the problem of fuel poverty – an equity issue – this will be expanded upon in the next section. In support of its energy policy goals, the Government has developed a range of policies and programmes, which are particularly designed to have an impact on emissions. The main ones are :

- The European Emissions Trading Scheme (EU ETS) - started on 1 January 2005 and is intended to make a significant contribution towards the reductions

in emissions that the EU is required to make under the Kyoto protocol. The first phase runs from 2005-07 and the second from 2008-12. The scheme covers all large industrial emitters of CO<sub>2</sub>, including power generation. Each participant starts with a number of allowances based on its assessed level of emissions minus an amount that is its reduction target. To deal with the shortfall in allowances, participants can either reduce their emissions or buy allowances from someone else. Allowances were not auctioned in Phase 1 and will not be auctioned in Phase 2. This has raised concerns about windfall profits being made by the electricity generators as the prices of generation have risen to reflect the value of allowances. It is estimated that the EU ETS will add 3-14% (depending upon the carbon price) to household electricity bills from 2005-2010 (DTI, 2006)

- Climate Change Levy – tax on energy use by industrial, commercial and public sector users of energy, designed to reduce their energy use. The levy is “revenue neutral” with other taxes being reduced to compensate and some of the proceeds are recycled to fund advice and loans for energy saving. Households are exempt from the levy.
- The Government has set a Renewables Target of 10% of electricity generation by 2010 (4% in 2005) and its main mechanism for achieving this is the Renewables Obligation (RO). Under the RO all electricity retailers are required to source a proportion of their electricity from renewable sources or to pay a “buy out” price (the proceeds of which go to those retailers who do meet their targets) if they do not meet their target. The RO in effect provides a subsidy for renewable energy – in 2005 this increased household electricity bills by 3% and this will rise to 6% by 2010 (NAO, 2005)
- Building regulations set minimum standards of energy efficiency for all new housing and other buildings.
- Minimum efficiency standards are set for some household appliances and equipment and other are subject to labelling (these standards are set at EU level).
- The Energy Efficiency Commitment requires all electricity and gas retailers to achieve kwh energy savings through their household customers. EEC started in 2002, although a predecessor scheme started in 1992. Retailers deliver EEC by subsidising energy saving measures (insulation, efficient appliances and lighting) to get their customers to take up the measures. The level of EEC has been rising and by 2010 it is estimated it will be adding 3% to household gas and electricity prices. The equity implications of EEC are recognised through the Priority Group requirement. (see below for more about EEC)

### **Fuel poverty in the UK**

Average household expenditure on energy is around 3% of income but around 2 million households in the UK would need to spend at least 10% of their income on fuel to achieve a warm home. (DEFRA&DTI, 2006) Households who would need to

spend at least 10% of their income on energy are defined as being in fuel poverty. Many on low incomes keep their spending below this level because they cannot afford to heat their homes adequately. The causes of fuel poverty are a combination of income levels and the costliness of heating the home (those on lower incomes are less likely to have gas heating, and have homes that are less well insulated). A substantial proportion of households in fuel poverty also have high needs for heating due to age and infirmity. Fuel poverty can damage people's health and quality of life - the prevalence of winter deaths is greater in people living in homes that are poorly heated.

Many on lower incomes also pay their bills by more expensive methods such as prepayment meters. It has been estimated that the median price paid for energy by households in the lowest income decile is 3.29p/kwh, compared to 2.8p/kwh for those in the highest income decile – this results from greater use of gas amongst the better off and the different payment methods used. (Ekins and Dresner, 2004)

It is the existence of fuel poverty that led the UK government to reject carbon taxes on households and to reduce VAT on fuel to 5%. As noted above, households have been excluded from the climate change levy.

Fuel or energy poverty is a concept that is almost unique to the English speaking developed world – UK, Ireland, US, Canada, Australia, New Zealand. It is barely recognised at all in the rest of the established EU countries, even in those with much colder climates than the UK. This is largely because heating and insulation standards have tended to be much higher in the colder northern European countries and welfare benefits are often higher in these countries as well. Central heating (often supplied through district heating using waste heat from power stations and industry) has been widespread in urban areas in much of continental Europe since the middle of the twentieth century. Energy poverty is increasingly becoming an issue in some of the eastern European countries however, which have a legacy of inefficient heating systems and poor building standards.

### **UK Fuel Poverty Strategy**

The UK Government's Fuel Poverty Strategy, published in November 2001, has an overall aim of eliminating fuel poverty in England by 2016 and eliminating it within vulnerable groups by 2010 as far as is reasonably practicable. The strategy includes a number of policies including improvements in welfare benefits and opportunities for work. However, energy efficiency is seen as a major part of the solution both because it will help to reduce fuel poverty, but also because it will contribute to the climate change strategy as improved energy efficiency can help to reduce emissions.

It has long been recognised in the UK that to ensure access to energy efficiency programmes by lower income and disadvantaged households, special initiatives are needed. Programmes that are open to every household on the same basis tend to be used disproportionately by the better off. This recognition goes back to the original Home Insulation Scheme established in the late 1970s, originally with a standard grant of 66% of the costs for all households. Low income and elderly households were much less likely to use the grants than the better off (largely because the required

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client contribution was unaffordable), so the scheme was changed into a two tier one – 66% grants for any household and 90% grants for low income and elderly households.

When the Energy Efficiency Commitment was introduced in 2002, the Government decided that energy retailers would have to achieve at least 50% of the savings from the Priority Group (households eligible for a range of welfare benefits, including low income elderly and disabled people and low income families). This was because retailers have an incentive to achieve the energy savings at lowest cost and this would drive them towards schemes for better off households who would require lower subsidies. As all households are paying the costs of EEC the scheme would therefore tend to be inequitable (most of the benefits going to better off households) without the Priority Group requirement.

There are three main sources of investment in energy efficiency for low-income households.

- The Warm Front scheme of government (taxpayer funded) grants for new heating systems, improvements to heating systems and insulation. Grants are for up to £2500 per household and available to families, elderly and disabled people who qualify for the main welfare benefits. In 2005/06 the programme was worth £190 million – this will rise to £380 million per annum by 2007/08. From the scheme's introduction in June 2000 to the end of 2006 over 1.3 million households received assistance from this programme. Warm Front applies in England only, but there are similar schemes in Scotland, Wales and Northern Ireland.
- The Energy Efficiency Commitment – obligations on energy retailers. Funds insulation and energy efficient appliances and lighting. About 50% of this is targeted to low income households (Priority Group) – estimated spend of £150 million per annum from 2005-08..About 35% of UK households fall into the priority group and it is estimated that about two thirds of them received some measures through EEC from 2002-05 (mainly low energy light bulbs – CFLs)
- Investments by local authorities and housing associations in their social housing stock to achieve the Decent Homes standard – investment of around £200 million per annum.

Current spending on energy efficiency for low income households is thus around £700 million a year and it has been estimated that this will need to rise to £1 billion a year from 2008-16 if the fuel poverty targets are to be met (FPAG, 2006) Debates continue about how the increased funding will be found – and indeed whether even more may be needed if energy prices remain high (prices fell from 1999-2004 but have since increased substantially due to a range of factors including world oil prices and EU gas markets). There is a debate during each phase of the EEC about how much of it should be devoted to the Priority Group – discussion are taking place at present about EEC 3 which will run from 2008-11. The equity argument favours keeping the level at least at 50% but energy retailers argue for it to be reduced on the grounds of cost, and within the government there are some who would also like to see it reduced so that it can contribute more carbon savings. The carbon savings are assumed to be lower from

Priority Group households than from the better off as the latter are heavier energy users and thus have more scope to reduce their use.

### **Renewables and decentralised energy**

Most of the new renewables developed under the Renewables Obligation have been built by large developers, particularly the major integrated energy retailers/generators. However, there have been some smaller projects developed by individuals and co-operatives that have had the effect of bringing income to rural areas. Co-operatives like the pioneers Baywind in Cumbria and Cwmni Gwynt Teg in Wales, have now been established in a number of locations, enabling local residents to have a financial stake in wind farms. A number of farmers have also become involved in growing energy crops that qualify for RO subsidy or have gained income (in the form of rent) for allowing wind turbines to be sited on their land. One example is WindWorks, an initiative by npower Renewables (part of RWE) to help farmers and landowners develop wind turbines on their land. WindWorks does all the work to get planning approval and finances, builds and owns the turbines. The landowner gets an annual income (typically £2500-4000).

These initiatives might be considered a benefit from an equity perspective, although the majority of individuals involved will tend to be relatively well off, even though they may live in rural areas where incomes are generally lower than average. Perhaps recognising the potential criticisms that they are mainly for the well off (the minimum share is usually about £300) a number of the co-operatives have used some of their income to invest in energy efficiency in the local community. In some other European countries energy co-operatives are more widespread and can bring significant benefits to rural areas. In Denmark, for example, wind turbines are mostly owned by co-operatives or individuals. In Austria, biomass co-operatives, particularly based on wood, have been developed as a means both of providing low cost heating and also to supplement incomes for those involved in forestry.

The other potential for decentralised energy and renewables to contribute to an equity agenda is in the provision of potentially lower running costs for energy – for example, if households can heat their water using solar panels or meet some of their electricity needs from a wind turbine. Such schemes might be developed on a micro (i.e. individual house) or community (from several houses or block of flats to a whole estate or village) level. Community schemes have been developed most extensively in Denmark.

In the UK there is currently growing interest in micro-generation and there have been various schemes to provide subsidies for these technologies over the past few years. The main scheme at present is the Low carbon buildings programme, which started in 2006. This has £50 million (for 2006-08) to fund grants for households, community organisations, schools, public sector and businesses to support small scale and micro-generation. The technologies supported include Solar thermal & PV, wind, hydro, bio-energy and ground source heat pumps. Grants cover 30-50% of costs up to limits. The scheme is currently being vastly over-subscribed, but such schemes inevitably will be relevant mainly to better off consumers who can afford the remainder of the high costs. However, renewable generation could be beneficial to low income consumers in

rural areas that lack access to gas. The Government is therefore developing some pilot schemes to test the potential.

### **Personal carbon allowances/quotas**

In July 2006, Environment Secretary David Miliband said that the Government will look at tradable personal carbon allowances (PCAs) as a means to combat rising emissions from the domestic sector. Miliband said such a scheme would be fairer than tax increases because personal carbon allowances provide free entitlements and only impose financial penalties for those who go above their entitlement. A PCA scheme that covered electricity, gas, petrol and air travel – would address 44 per cent of the economy's total emissions.

Miliband said: "Imagine a country where carbon becomes a new currency. We carry bankcards that store both pounds and carbon points. When we buy electricity, gas and fuel, we use our carbon points, as well as pounds. To help reduce carbon emissions, the Government would set limits on the amount of carbon that could be used. People on low incomes are likely to benefit as they will be able to sell their excess allowances. People on higher incomes tend to have higher carbon emissions due to higher car ownership and usage, air travel and tourism, and larger homes." (Miliband, 2006)

Personal carbon tradable allowances are one of a number of options the Government is examining to encourage individuals to be better informed and personally involved in tackling climate change. Carbon loyalty cards, league tables, the use of carbon offsets at point of purchase for certain sectors, awareness raising through labelling and carbon calculators are also being investigated as potential long-term measures.

The 2006 Energy Review highlighted that the Government (Department of Communities and Local Government, Defra, Department for Trade and Industry and HM Treasury) will undertake a joint study that will look at the role of "community level" approaches to mobilising individuals, and the role of local authorities in particular in making them work effectively. The study will draw on experience of what initiatives have and have not worked in both the environmental area and other policy areas, such as public health. In the light of this information, the study will examine what new policy options, such as tradable personal carbon allowances, could be deployed to stimulate local action and consider their relative advantages and disadvantages. The pilot will report back to Ministers in the first half of 2007.

Personal carbon allowances (PCAs) – e.g. based on equal per capita allocation of allowances – would theoretically be progressive. This is because, in general, people on low incomes emit less carbon dioxide than average (particularly if personal air travel is included) and the better off emit more than average. The rich will therefore need, on average, to buy allowances from the poor to sustain more carbon-intensive lifestyles. (Dresner and Ekins (2004).

However, some poor households lose out and some rich households win because there are significant differences in expenditure on energy and travel within income deciles.

Thus, while most poorer households emit less than average, many emit more (and vice versa with richer households) However, as the table below (Dresner and Ekins (2004) shows, even with this taken into account, fewer than 1 in 5 of households in the lowest equivalent income decile would be worse off, and most of those would be worse off by only a small amount (depending on the price of carbon – assumed at £10 per tonne in the table below).

Deciles	average net change £/year	per cent losers	per cent gainers	per cent losing > £1pw
1	36.31	18	82	3
2	23.55	27	73	2
3	23.10	27	73	4
4	14.48	34	66	7
5	7.32	43	57	8
6	-3.58	47	53	10
7	-7.32	54	46	13
8	-20.23	68	32	21
9	-29.60	75	25	27
10	-42.95	78	22	31
All	0.00	48	52	13
Households with children	+11.14	41	59	13
Households with pensioners	+12.33	32	68	2

(Dresner and Ekins, 2004)

Dresner and Ekins also found that carbon allowances would be more progressive than a carbon tax. Even if the tax revenues were recycled as effectively as possible through targeted increases in benefits to low income households, 30% of households in the lowest decile were still worse off (cf 19% for individual carbon trading)

However, as Roberts and Thumim (2006) point out, the research has not taken into account housing energy performance as it only examined actual expenditure on fuel as opposed to required expenditure on fuel. Some households, in energy inefficient homes will need to spend more on energy (and therefore need more carbon allowances) in order to be warm. Thus the introduction of individual carbon allowances and trading could exacerbate fuel poverty. In addition, other factors also need to be better understood such as geographical distribution, including rural/urban

and north/south. Access to opportunities to reduce emissions (information and advice, services, products and capital) is also relevant since it is unlikely that provision is evenly spread by income or geography.

Roberts and Thumim point out that there has been virtually no research into how people would respond to carbon allowances and that much more of this remains to be done. They also looked at research that might shed light on whether people in general (and different groups) might be able to manage a carbon budget and allowances and take part in trading. Whilst there is no directly relevant research they looked at work on “financial literacy” which has some read across. If findings were similar this would suggest that 20% of the population would not easily manage carbon allowances and a significant proportion of these would be on low incomes (but financial literacy is not directly correlated with income). Those who would manage best would be well off older couples, those who would manage least well would be low income younger women and low income families with children. Further evidence on the equity issues around use of the scheme comes from the introduction of the Child Trust Fund scheme – under which the Government gives the parents of every child born since 2002 a £250 voucher (£500 for low income families) to invest in a savings account on behalf of their child. One year after the scheme’s introduction one quarter of the vouchers had not been used, and a number of extra efforts are having to be made particularly to increase take up amongst low income families.

Design issues can also affect distributional impacts – for example should children receive allowances ? If they do not then households with children may be disadvantaged relative to those who do not; and vice versa (e.g. pensioner households) if children do receive allowances.

Personal carbon allowances are therefore an interesting idea and there is much debate on them in the UK. They are not Government policy – although the Environment Minister is very keen, others are less keen – and are not likely to become policy in the short term as there are too many issues that still need to be examined and resolved.

### **Relevance to Australia of UK experience**

The problems faced by low income households in terms of affordable energy may be more acute in the UK but they are clearly relevant to Australia, although in some areas it may be difficulties affording adequate cooling in summer that is the bigger problem than winter heating. Thus energy efficiency, which has been found to be an important part of the solution both to fuel poverty and a contribution to tackling climate change, could play a similarly important role in Australia. The need to ensure that policies to promote energy efficiency are suitably adapted to the needs of low income households – so that such schemes do not become only for the well-off – thus applies as much in Australia as it does in the UK.

In the area of renewables and decentralised energy there may be more scope for a contribution to equity in Australia than in the UK, given the remoteness of many rural areas in Australia and the relatively low incomes in rural areas. However, as in the UK, schemes to promote renewables and decentralised energy, as with energy

efficiency, need to be designed effectively to ensure that those on lower incomes can benefit.

Personal carbon allowances are an idea worth investigating, although there are many theoretical and practical issues to resolve. As part of this it will be useful to do some detailed work on equity implications – e.g. like the work done by Dresner and Ekins in the UK. There may be an important difference between Australia and the UK that would be worth investigating. PCAs look particularly good from an equity perspective in the UK if they include transport, because low income households in the UK are less likely to have cars or to use air transport. One suspects that this may not be so true in Australia due to a greater need for car ownership because of lack of public transport in suburbs and rural areas. Similarly, it may be that air transport use is also more common amongst lower income groups in Australia than the UK due to the long distances.

### **Conclusion**

Climate change will have impacts on equity but in the short term it is the policy responses to climate change that will have the most impact. Some policies that mitigate climate change can have positive social benefits as well – notably energy efficiency for low income households. Tackling fuel poverty is a key requirement if economic instruments (taxes or trading) are to be used to greater extent in the future and energy efficiency has a major contribution to make in this regard. Policy design needs to take account of equity to avoid conflict between environmental and social goals.

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