Climate Change, Double Injustice and Social Policy

A Case Study of the United Kingdom

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Acronyms

CCC	Committee on Climate Change
CMP	Carbon mitigation policy
CO_2	Carbon dioxide
CO_2e	Carbon dioxide and its equivalent in greenhouse gases
COICOP	Classification of Individual Consumption by Purpose
DECC	Department of Energy and Climate Change
EFS	Expenditure and Food Survey
EME	Emerging economy
ETS	Emissions Trading System
EU	European Union
GDP	Gross domestic product
Mt	Millions of tonnes
OECD	Organisation for Economic Development and Co-operation
PCAT	Personal carbon allowances and trading
REAP	Resources and Energy Analysis Programme
SEI	Stockholm Environment Institute
UK	United Kingdom
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
VAT	Value added tax
WTO	World Trade Organization

Summary

The groups and populations likely to be most harmed by climate change are the least responsible for causing it and have the least resources to cope with the consequences—this is the "double injustice". It forms the background to climate negotiations between governments representing countries of the North and the South, but it also occurs within nations across the world. In light of this phenomenon, what are the distributional implications of current, fairly ambitious, policies to decarbonize the economy? Based on research within rich countries of the Organisation for Economic Development and Co-operation (OECD), and building specifically on UK studies and data, this question is answered in two parts: within the Kyoto framework and beyond it. This paper complements the author's Report for the British Council on *Climate Change and Public Policy Futures*.

The United Kingdom is legally committed to reduce emissions of greenhouse gases by 80 per cent by 2050, compared with the base year of 1990. The European Union has similar collective commitments. These drastic targets are to be implemented via a wide range of carbon mitigation policies (CMPs). This paper considers the social dimension and distributive implications of these policies, and how these might be tackled.

First, the paper finds that many CMPs in the United Kingdom are highly regressive, notably those where energy companies are "obliged" by government to improve energy efficiency and increase renewable energy, the costs to be met by increasing energy prices for domestic and business users. Since energy is a basic good, it comprises a far higher share of spending in lower income households; thus such cost hikes are regressive. CMPs bear more heavily on poorer households.

It is impossible to fully recompense lower income households for these cost increases via social benefits, tax allowances and credits because of the heterogeneity of their circumstances and their dwellings. Thus alternatives are sought on grounds of social justice and/or to prevent sustained political opposition to further carbon mitigation policies.

The only secure route out of this dilemma is to consider additional policies: introducing a special low income price index and "social" energy tariffs which charge less for the first blocks of energy use and more thereafter. The latter would entail reversing the liberalization of energy markets of the past three decades. But the essential policy is a huge increase in "eco-social investment": mass retrofitting of the housing stock and the deployment of radical conservation measures. These might compete fiscally with existing state social expenditures in times of fiscal stringency.

The second part of the paper goes beyond the Kyoto framework to consider total consumption-based emissions within the United Kingdom, including those embodied in imports from the rest of the world. The gap between the two is remarkably wide: the United Kingdom consumes one-third more carbon than it produces and one-half more greenhouse gases (GHGs). With globalization the North has exported a significant part of its GHG emissions to emerging market economies, such as China.

What are the distributional patterns of consumption-based emissions in the United Kingdom and how might they be curbed? This paper presents a new analysis showing that household income is a major driver of emissions per person, alongside household size and employment status. But the income elasticity of emissions is low, so that again they constitute a higher share in low-income households. Thus higher carbon taxes or tighter carbon allowances would again impinge on households in a regressive way: they would bear more heavily on low-income households, single-person households and workless households.

To combat this, the author argues, would require the more explicit integration of climate mitigation and social justice goals. Three radical options are considered: personal carbon

allowances and trading, reduced working time, and the taxation of consumption and income. Each raises issues of implementation and knock-on effects, but together they point the way. To combine a green economy with a fair social dimension would entail integrating the redistribution of income, time and carbon.

The double injustice of climate change within developed nations discussed in this paper also has implications for double injustice both between nations on a global scale and within developing nations. At the global level, the faster rate of growth of developing Asia and other emerging market economies over the past two decades, coupled with severe deflationary prospects in much of the North, points to a new era of catch-up and convergence in income levels—relative, if not absolute. This will apply to consumption and emissions too. It will mean that a greater share of the emissions produced in countries such as China will be consumed within their borders, rather than incurred to benefit Northern consumers.

But while inter-national inequality is starting to decline (thus changing the inter-national distribution of emissions), intra-national inequality continues to increase in both poor and rich countries. As China and others prepare to participate in a post-Kyoto institutional framework to regulate GHG emissions, it will be essential to ensure that the burden of carbon and other cuts is not imposed on the poorest. There is therefore a need for further research into the distribution of emissions by income, household composition and other relevant variables within countries in the South, and to model the distributive impacts of various policies to restrain GHG emissions. Such research could draw on the sort of experience in developed economies presented in this paper.

Compared to the conditions of strong economic growth and the export of carbon emissions in which welfare states emerged in the North, today's world of much slower growth and of rising clamour to correct the emissions deficit will require a profound reshaping of welfare states in the twenty-first century. In sum, social policy would need to be further integrated with carbon mitigation policies, and new forms of policy coherence will be needed.

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Introduction

The groups and populations likely to be most harmed by climate change are the least responsible for causing it and have the least resources to cope with the consequences—this is the "double injustice". Originally developed to understand the dilemmas posed by climate change for a just and equitable world order, the double injustice can also be applied to the situation within countries—in both South and North. This paper concentrates solely on the North, and is based on a case study of climate change and social equity within the United Kingdom. My approach will try to combine normative concerns with a realpolitik political economy analysis.

UK and EU governments are already committed to drastic reductions in the output of carbon and other greenhouse gas (GHG) emissions to counteract this future risk. So the issue arises, how will these carbon mitigation programmes impact on the most extensive group of existing state policy commitments—those of the welfare state? This is answered in two parts: within the Kyoto framework and beyond the Kyoto framework. For the purpose of this paper, the distinction is between monitoring and reducing emissions produced within a given territory compared with those originating from consumption within a given territory. In both cases, I consider only dilemmas arising within rich countries of the Organisation for Economic Co-operation and Development (OECD—the North); within these my data and examples are taken from the United Kingdom.

In the first stage, two questions are posed: fiscal and distributional. First, will climate mitigation programmes compete for public resources with social programmes, at a time of the steepest ever cuts in public spending? Second, will the distributional consequences of climate mitigation programmes create new social injustices that in turn impose new demands on the welfare state? The short answers to these two questions are "no" and "yes". Thus we consider ideas for rethinking social policy to cope with the distributional dilemma posed by climate mitigation—that almost all policies to reduce emissions bear more heavily on lower income groups, even though they emit far less than richer households. To counter this, the social dimension must be integrated with the environmental dimension. This requires more policy integration, and examples are discussed focusing on social policy.

But even this is insufficient because it takes for granted the focus of the Kyoto Protocol on the production of GHGs in Annex I countries,[1] not the GHGs embodied in their consumption of goods and services. New analysis shows that the gap is wide due to outsourcing of manufacturing to emerging market economies, such as China. This paper goes on to analyse the distribution of total embodied GHGs within the United Kingdom, revealing a similar distributional dilemma. To reduce consumption emissions in the North while avoiding greater inequality within the North, a set of more radical policies is advanced, including carbon rationing, reduced hours of work and taxation of consumption. This will require more policy integration across economic, social and environmental domains.

Climate Change and the Challenge to Social Policy

There is a strong scientific consensus that global warming is happening, that it is largely man-made, that it is global, cumulative and potentially destructive, and that it will have to be brought under control sooner or later if disaster is to be avoided.[2] This paper accepts this dominant scientific consensus.

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[1] Annex 1 countries comprise the industrialized countries that were members of the OECD in 1992, plus the Russian Federation and other transition economies in Central and Eastern Europe.

[2] IPCC 2007; Stern 2007; Royal Society 2010; Committee on Climate Change 2010.

Our concern here is the impact of climate change on future economic and social well-being. The causal chain is long; a simple and incomplete model linking these is shown below:

Economic activity →
Energy consumption →
Greenhouse gas emissions →
GHG cumulative concentrations →
Global temperature rise →
Regional climate change →
Impact on human habitats →
Social well-being

It is common to distinguish two categories of climate change policies: mitigation and adaptation. Mitigation policies act to reduce greenhouse gas emissions or to increase greenhouse gas sinks. Adaptation policies reduce the damaging effects of climate change that does occur, but do nothing directly to prevent it**.** Broadly speaking, mitigation policies address the first three factors in the model above and adaptation policies address the last two. (A third category, which purportedly addresses the in-between links in the chain, is geoengineering, that is, the large-scale engineering of the earth's environment to counteract trends in atmospheric chemistry; this is not considered here.)

Gough et al. (2008) analytically distinguish four impacts on rich countries of the OECD such as the United Kingdom.

- Direct impacts of climate change itself, distinguishing
    1. impacts in the North;
    2. the results in the North of impacts elsewhere in the world.
- The impacts of climate change policies, distinguishing
    3. adaptation policies;
    4. mitigation policies.

Direct impacts in the North

Most models predict substantially greater direct negative impacts on habitats and livelihoods in tropical and subtropical regions, which are also in general poorer than the temperate zones and bear little responsibility for the historic accumulation of GHGs in the atmosphere—the double injustice on a global scale. But this does not mean the Northern, richer world will be unaffected. Australia, Southern Europe and the southern United States will experience rising heat and water stress, and low-lying coastal regions such as the Netherlands and perhaps London will be vulnerable to rising sea levels. According to a Foresight report (2011a), direct impacts in the United Kingdom are likely to be mild over the next two decades. The Joseph Rowntree Foundation is currently promoting research on the direct impacts of likely climate change on social welfare and social justice in Britain, including flood risks, drought risks and heat waves (Benzie et al. 2011). The Department of Health first published its heat wave plan for the United Kingdom in 2004, and it has been revised several times since. In my view, these risks, and the costs of managing them, will not be especially burdensome for a rich country over the next three decades. However, there will be distributive consequences as direct impacts are likely to affect lower income groups more: more live in higher risk areas, such as floodplains, and fewer have adequate insurance (Walker and Burningham 2011). I do not here pursue further this aspect of double injustice within the North.

Indirect impacts in the North

A recent UK Foresight report (2011a) on the international dimensions of climate change considers a vast array of potential threats which may indirectly impact on the rich world, including resource scarcity, epidemics, degraded coastal infrastructure impeding shipping,

disruption of vital oil and gas supplies, insecurity of food supplies, and rising and more volatile prices, disruption of international economic networks and chains, growing restrictions on free trading and global financial institutions, slowing global economic growth, collapse of weak states, and growing international tensions weakening global governance.

Perhaps most relevant is the potential for rising levels of environmental migration from areas such as tropical Africa and South Asia, the subject of a second major UK Foresight report (2011b). This notes that climate change and environmental degradation will be superimposed on existing and growing powerful drivers of migration: economic, demographic, social and political. These have resulted in some 740 million internal migrants at the turn of the millennium and some 210 million international migrants by 2010. Many of these are migrating to cities in vulnerable areas, notably floodplains that will be exacerbated by climate change. Others have already been displaced by environmental pressures, for example, the 100,000 who have moved away from the area around the desiccated Aral Sea. The estimated numbers displaced by natural hazards rose from 17 million in 2009 to 42 million in 2010. But those estimated to be affected by floods in 2060 are much greater, between 472 million and 552 million. The report points out that "no migration" is not a policy option. In many cases, migration affords an opportunity. But migration requires assets and these may be degraded by future climate change, resulting in large "trapped" populations. If migration is an essential component of climate change adaptation, it is unlikely that this will leave the rich North unaffected.

Adaptation policies in the North

Adaptation policies in the North include investing in flood defences to protect against storm surges, extra reservoir capacity and making buildings more resilient to climate change. The *Stern Review* (Stern 2007:417–429) estimates that OECD member countries would need to invest between 0.05 per cent and 0.5 per cent of GDP extra each year in adaptive measures, and more if temperature rises exceed the central forecast (Fankhauser 2010 provides more recent but still widely varying estimates). These figures are high but not daunting. The contrasts with the poorer developing world are extreme. In the words of Desmond Tutu, "rich countries can use their vast financial and technological resources to protect themselves against climate change, at least in the short term…But as climate change destroys livelihoods, displaces people and undermines entire social and economic systems, no country—however rich or powerful—will be immune to the consequences. In the long-run, the problems of the poor will arrive at the doorstep of the wealthy" (in UNDP 2007:166).

All these critical issues are left aside in what follows. The remainder of this paper will concentrate on the impacts of climate mitigation policies (CMPs) on social policy in countries in the North, primarily responsible for global warming but facing a double injustice within their own borders.

The Kyoto Model: Production of GHGs

The response of the North: European Union versus United States?

It is widely recognized that the UN Framework Convention on Climate Change (UNFCCC), and the Kyoto Protocol, confirms the responsibility of rich Northern countries for past emissions via the principle of "common but differentiated responsibilities" (IPCC 2007:33). It is also recognized that this framework has proven quite inadequate in restraining emissions. But less well researched is the variation across Annex 1 countries in their carbon mitigation efforts. The survey by Christoff and Eckersley (2011) reveals sharp differences across Northern nations in their past emissions performance, present rankings on emissions intensity, and policy aspirations for the future. Their data shows that Germany and the United Kingdom are climate change leaders on all measures, though this masks the great improvements exhibited by France

and Japan in the 1970s and 1980s—and their database of large emitters omits the small Nordic countries who are also leaders. The clear laggards are Australia, Canada and the United States. The fact that all these countries are rich democracies shows that capitalism and democracy alone are poor predictors of climate mitigation, so what are the most important determinants of progressive carbon policies?

Christoff and Eckersley (2011) find several determinants. First, domestic political institutions play a role: proportional representation (versus first past the post) and significant green parties, parliamentary rather than presidential constitutions, and corporatist systems that include business and labour, rather than majoritarian parliamentary systems, all favour robust CMPs. Second, national vulnerability to climate change is a poor predictor (Australia is a highly vulnerable country), but reliance on fossil fuel extraction and energy intensive industry heightens opposition to carbon reduction. Third, the construction of ideological discourse is important. In the Australia and the United States, climate science has been reduced to an "ideological marker" between adversarial political parties, and climate deniers have been accorded much space in the media. This links to the role of veto-coalitions among fossil fuel producers and energy-intensive industries, notably in Australia, Canada and the United States.

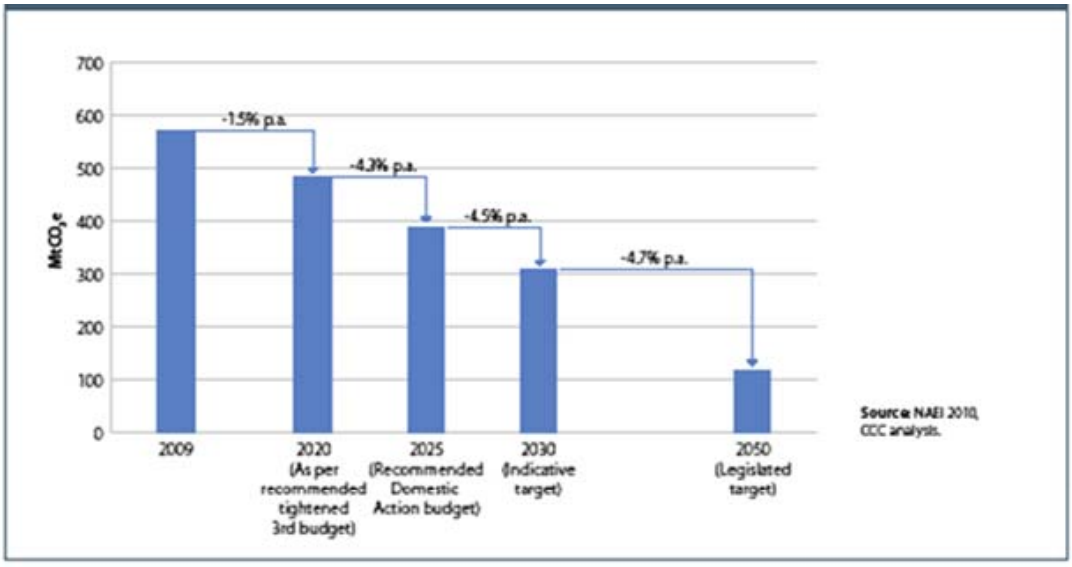
Together these can explain the pre-eminent role of Germany and the Nordic countries: 20 years of aggressive carbon constraints to enforce technological innovation and new green jobs which then generate path-dependent green growth. But how can we explain the more recent leadership of the United Kingdom? In my view, the answer is its crash deindustrialization in the 1980s and 1990s. The intent of the Thatcher government to destroy the mining unions and pursue the "dash for gas" laid the basis for this. The subsequent deindustrialization of the United Kingdom meant that there has been no overwhelming business lobby within industry or the trade unions opposed to decarbonization, while at the same time new opportunities have arisen in carbon trading for the City of London. This, together with the unsustainable exploitation of North Sea oil and gas (which is now declining), explains the continuing commitment of the coalition government to the pursuit of green policies, at the same time as it unleashes a savage onslaught on the welfare state.

UK Climate Mitigation Programmes and their fiscal impacts

What then is the record of one of the climate leaders—the United Kingdom? The UK government is said to have adopted the world's most demanding and legally binding targets to reduce CO_2 and other GHGs. The Climate Change Act 2008 commits the United Kingdom to reduce GHG emissions by at least 80 per cent by 2050 and by at least 34 per cent by 2020, compared with the base year of 1990. Furthermore, it has set three intermediate targets or "carbon budgets" up to 2022, and in May 2011 the coalition government committed the United Kingdom to further radical reductions for the fourth budget period 2023–2027. Figure 1 below sets out the remarkable transformation in UK emissions to which it is committed (in millions of tonnes of CO_2 and its equivalent in other greenhouse gases—$MtCO_2e$).

The Climate Change Act established the Committee on Climate Change (CCC) as an independent body to advise the government on setting and meeting carbon budgets. At the same time, the new Department of Energy and Climate Change (DECC) published *The UK Low Carbon Transition Plan*, which set out detailed targets and programmes to achieve these goals. This, and the subsequent very detailed reports of the CCC, analyse plans and achievements in reducing emissions under five main headings: power and heavy industry (which accounts for about one-half of all emissions); transport; homes and communities; workplaces and jobs; and farming, land and waste. The coalition government has so far broadly stuck to these targets and programmes.

Figure 1: Rate of reduction of greenhouse gas emissions, UK 2009–2050



Source: Committee on Climate Change 2010:25.

A recent OECD report (Bowen and Rydge 2011) provides an overview and evaluation of climate change policies in the United Kingdom, which can be summarized under three headings: pricing emissions, promoting clean energy, and improving energy efficiency (see box 1).

Box 1: Major UK Climate Mitigation Policies

These can be divided according to three goals.

1. *To price emissions.* This is achieved in the United Kingdom almost entirely via market-friendly price signals rather than green taxes. The United Kingdom is part of the EU–wide Emissions Trading System (ETS) that sets an overall cap on power generators and large industrial concerns. It requires companies to submit allowances to cover their verified emissions, which companies can trade. The ETS covers about one half of UK carbon emissions, but it has generated a volatile and far too low carbon price to achieve the desired carbon reductions. In addition, a range of other policies, allowance systems, taxes and tax exemptions exist in the United Kingdom on top of the ETS, reducing efficiency and distributive clarity.

2. *To promote clean energy.* The EU commitment is ambitious—that 20 per cent of final energy demand should be generated by renewables by 2020. The main UK policies are to obligate energy suppliers to increase their share of renewables, but progress has been slow. Nuclear and carbon capture and storage options now figure here. A Green Investment Bank has been established but with small funding and no access to market funds until at least 2015; public investment is low.

3. *To improve energy efficiency.* The main target here is energy loss in domestic homes, which accounts for over 20 per cent of UK GHG emissions. Again, obligations on energy suppliers to deliver household energy savings form a cornerstone, now to be augmented by the Green Deal (not to be confused with plans for a Green New Deal). To avoid public subsidies, this will be financed by intermediaries via the projected savings in household energy costs. It is too early to judge its success. Few initiatives have been implemented to improve energy efficiency in transport, though fuel taxes are high.

The United Kingdom's success in reducing emissions in the past two decades has been greatly due to one-off factors such as the "dash for gas" instituted by the Thatcher government and more recently the severe recession. The impact of the existing CMPs is low, and a steep change will be needed to meet the government's ambitious targets (Bowen and Rydge 2011). Opposition to a more direct role for government has prevented any significant public subsidy

or support for a green economy. The current direct expenditure of all government CMPs is currently £1.1 billion,[3] less than 0.1 per cent of GDP, and some programmes are now being cut (Marden and Gough 2011). But the extensive obligations on energy companies are intended to be financed via price increases for all domestic consumers. These quasi-taxes are more regressive than taxes in general.

Carbon mitigation and the distributive dilemma

What are and will be the distributional consequences of these CMPs? DECC (2010) estimates the impact of these mandated policies on energy prices, and of energy bills for consumers and medium-size commercial enterprises in 2010, 2015 and 2020, compared to a counterfactual of no climate change policies. Its central scenario, in which the price of oil is assumed to be $80[4] per barrel by 2020 (at 2009 prices), predicts that these mitigation measures will add 18 per cent to average domestic gas prices and 33 per cent to average domestic electricity prices (on top of any in the base prices). The average impact on actual energy bills will depend on the uptake of energy efficiency measures and renewables incentives. The DECC estimates assume great success in this respect, with average domestic bills expected to be only 1 per cent higher by 2020. These assumptions may be over-optimistic, not to say complacent.

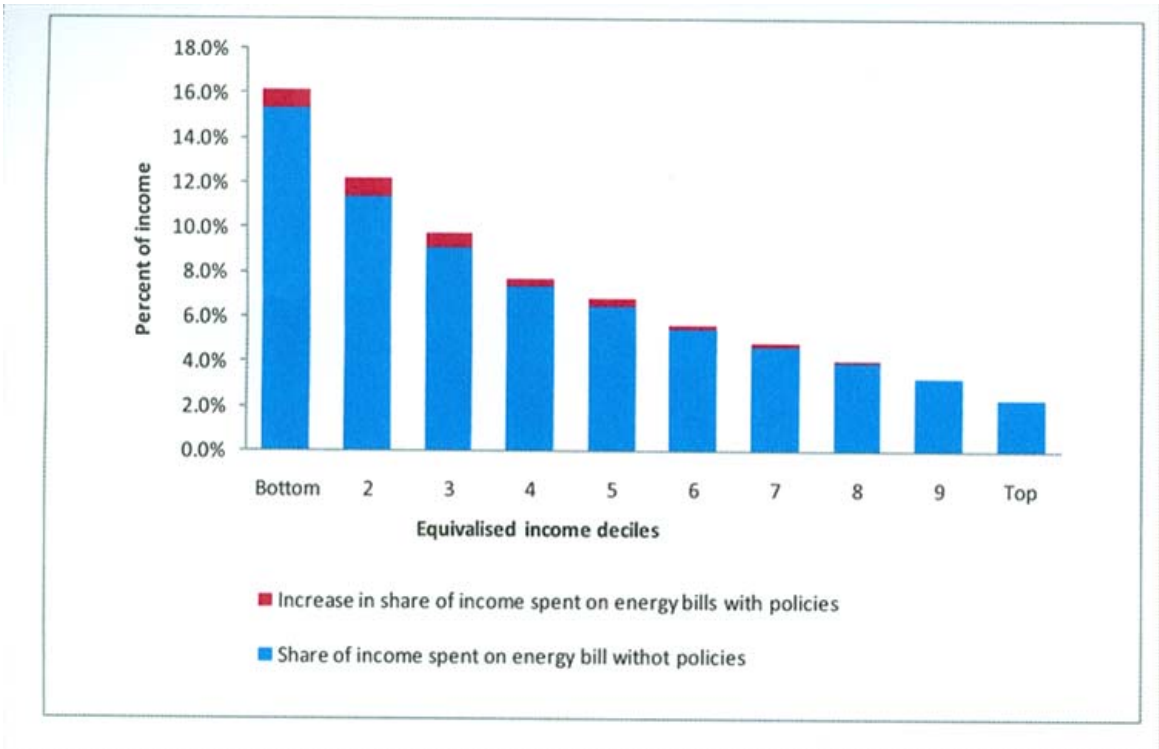
Even so, the overall burden estimated by DECC is regressive (see figure 2 below), and the cost of CMPs will reduce incomes in the lowest decile by 1 per cent while benefitting higher income groups slightly. Those taking up insulation measures will see their bills fall but others will see their bills increase. It is admitted by the CCC and DECC that these burdens will fall more heavily on lower income households—and this is intended (DECC 2010).

This will likely worsen fuel poverty. According to the Warm Homes and Energy Conservation Act 2000, fuel poverty exists when a member of a household lives on a lower income in a dwelling which cannot be kept warm at reasonable cost. Since 2001 it has measured in the United Kingdom as a situation where a household needs to spend more than 10 per cent of its income on total fuel in order to heat its home to an adequate standard. According to Hills (2011), such carbon mitigation policies could have a negative impact on fuel poverty. The conclusion is that present climate mitigation in the country has a negative effect on income equality (see also Büchs et al. 2011). There is an apparent contradiction between environmental sustainability and social justice goals.

[3] £1 = $1.6 approximately (December 2011).

[4] All $ figures refer to US dollars.

Figure 2: The "distributional dilemma"



Source: DECC 2010:5 (chart 7).

Compensatory social policies

The orthodox reply of economists is to use social policy to compensate the losers. For example, the recent OECD report calls for the value added tax (VAT) on domestic energy use in the United Kingdom to be raised from its present low level of 5 per cent to the standard rate of 20 per cent, with distributional concerns to be addressed through targeted support (Bowen and Rydge 2011). However, a wide range of studies shows just how difficult this is because the domestic energy use of households is so variable.[5] Thus, given across-the-board compensation, Thumin and White predict large numbers of low-income losers including large families in rural, hard-to-heat houses, "empty nesters" in large houses and houses without gas central heating, retired under-occupied urban households, and urban households with vehicles (this is not an exhaustive list).

There are two problems in using the tax and social benefit system to compensate the losers, including low-income losers. First, if the CMPs are tax based, then cost-neutral compensation packages can be devised, such as raising tax thresholds, benefits and tax credits. But the heterogeneity of housing and of households means that there will always be gainers and losers, however the compensation operates. It may be possible to give extra benefits to rural dwellers, or people under-occupying large houses, or single and separated householders, but these would carry other efficiency and distributive costs. Hills (2009) concludes that even the most progressive use of revenues from carbon taxes to protect the poor would leave up to a third of low-income households losing out.

A second problem arises when the CMPs are market-based cap-and-trade programmes or company obligations. Here, there are no obvious revenues to use to compensate losers.

[5] Druckman and Jackson 2008; Thumin and White 2008; Dresner and Ekins 2006; Büchs et al. 2011.

The only sustainable alternative is to radically expand the programme of eco-social investment, as in various proposals for a Green New Deal (UNEP 2009; NEF 2008). These call for a sustained public programme to invest in renewable energy, to retrofit the housing stock and to deploy radical conservation measures. This would at the same time boost demand in slow growing post-crisis economies like the British and create new employment opportunities in the reconstruction programme and elsewhere. It is a radical proposal for policy integration for a post-crisis economy. Some of this expenditure would be on the capital account, but to incentivize serious inroads into household energy savings would also require public subsidies that could compete fiscally with current reduced social spending on the welfare state. Advocates of a more radical proposal for a Green New Deal would contend that the investment boost would benefit public finances in the longer term, but this would require a shift in current orthodox economic thinking (NEF 2008). This important issue is not considered further here.

However, even if this was implemented in a crash programme starting today, many households, notably on low incomes, would find themselves squeezed by rising fuel and carbon mitigation costs for a decade or more (there are 25 million dwellings in the United Kingdom, most of which are energy inefficient). Thus some form of ongoing compensation would also be necessary, on justice grounds and to forestall political opposition. This might entail computing a special low-income price index to take account of the regressive effect of rising domestic energy prices. UK inflation rates over the 11 years, 2000–2010, reveal a higher rate in the lowest quintile group: 3.4 per cent, compared with 2.9 per cent in the highest decile (IFS 2011). This was especially so in 2006 and 2008 when gas and electricity prices soared (by 31 per cent and 52 per cent respectively in 2008). The central DECC projections of fuel cost increases mentioned above will drive up low-income inflation, even though lower income households exhibit greater price elasticity than higher income. In other words, consumption will likely decline as costs paid will increase. Nevertheless, a separate index for low income and pensioner households and workers on the minimum wage would appear to be necessary as we enter an era of steadily rising oil—and food—prices.

Another form of quasi-compensation would be to adjust the energy tariffs faced by different households and income groups. This could be done via social energy pricing by lowering the marginal costs of initial units of electricity or gas or oil consumed, and raising the marginal costs of successive units. This would recognize the "basic need" component of the first block of household energy and the progressive choice element in successive units, and thus would be intrinsically progressive. The UK Office of Gas and Electricity Markets (Ofgem 2009) has modelled a scheme where electricity charges are lower for the first 2,000 kilowatts hours per year and then rise sharply. It would be both progressive and exert price constraints on higher user households. Though this solution has been raised by the CCC (2008), it would require a radical shift in the pricing policies and regulation of private utility companies—a reversal of the liberalization and deregulation agenda of the past three decades.

Conclusion

Existing moves toward a low-carbon economy are exacerbating distributional inequalities, especially in countries like the United Kingdom where the cost falls on energy suppliers who pass them on to general domestic consumers. Even the best compensatory measures cannot protect all low-income losers, even if social benefits were to be uprated by a low-income price index. More radical policies, such as social energy pricing, would require deliberalizing energy markets. The essential policy is serious eco-social investment to retrofit and improve domestic energy performance but this may compete for public funds with existing welfare commitments at a time of general cutbacks.

Post-Kyoto: From Production to Consumption

But this is only one half of the story. The Kyoto Protocol is concerned only with the emissions of carbon and GHGs within national territories. But globalization has fostered a widening gap between these emissions and the consumption of populations, and thus the GHGs embodied in this consumption. (Consumption here refers to all expenditure components of GDP, including government consumption and investment.) Table 1 below compares my estimates of the two sums for the United Kingdom in 2006. It shows a wide divergence: UK CO_2 emissions are 33 per cent higher when offshore production of goods consumed is taken into account. This is close to the 37 per cent gap reported for 2000 by an OECD report (Nakano et al. 2009:22). The table also reveals the United Kingdom's consumption-based emissions of all greenhouse gases to be an astonishing 51 per cent higher than its production of greenhouse gases—one of the widest gaps in the world.

Table 1: Comparison of production- and consumption-based UK emissions

United Kingdom, 2006	Carbon emissions CO_2			All greenhouse gas emissions: CO_2e		
	Production-based	Consumption-based	Difference	Production-based	Consumption-based	Difference
Total emissions	551mT	733mT	+182mT	650mT	984mT	+334mT
Emissions per capita	9.1T	12.1T	+3.0T	10.7T	16.2T	+5.5T

Data sources: Production-based: DECC, UK Greenhouse Gas Emissions 1990–2009, Table 1: headline results. www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2009_final/2009_final.aspx, accessed on 11 June 2011; Consumption-based: Stockholm Environment Institute, Biology Department, University of York, Footprint Results from BRIO model, October 2009. www.resource-accounting.org.uk/downloads, accessed on 11 June 2011.

According to Helm et al. (2007), this reverses the supposed success of the UK record. While on the official recorded basis, UK greenhouse gas emissions have fallen by 15 per cent since 1990, on a consumption basis, emissions have risen by 19 per cent over the same period (see also Nakano et al. 2009). Part of the United Kingdom's "success" is due to the outsourcing of production to the developing world. Conversely, a significant part of China's exploding emissions come from the production of goods for export to the North. Not surprisingly there is increasing criticism of the Kyoto production-based framework. Hence we need to broaden the analysis to consider the wider distributional impact of all GHG emissions, both direct and indirect. And "any changes to this notion of responsibility for trade-related emissions would profoundly reshape assessments of national responses to climate change" (Christoff and Eckersley 2011:433).

Household GHG emissions in the North

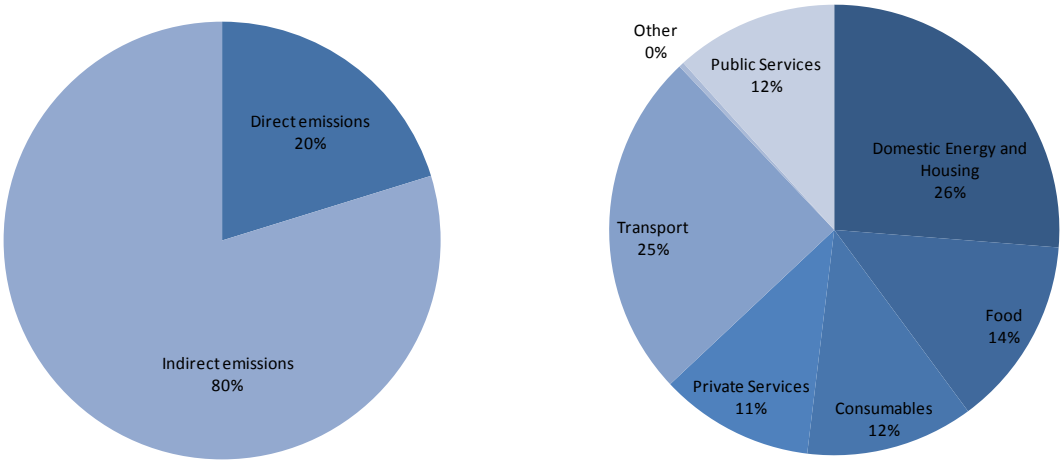
Consumption-based emissions in the United Kingdom in 2006 averaged 33.2 tonnes CO_2e per household, according to data based on the Stockholm Environment Institute's (SEI) Resources and Energy Analysis Programme (REAP), an input-output based software tool that calculates the environmental pressures (footprint) associated with consumption activities (see table 2 and figure 3). On a per capita basis, the average household emitted 15.2 tonnes GHG. Of this, public services (mainly health and education) accounted for 1.8 tonnes, and private consumption for 13.4 tonnes. The table also shows the breakdown between the major private expenditure items. This shows that direct emissions—household domestic energy use and petrol and diesel for private cars—account for only 20 per cent of total private emissions. The pie chart also shows the shares of emissions accounted for by major categories of consumer spending.

Table 2: Consumption-based emissions

	Per capita emissions		Household emissions		Per equivalent adult emissions	
Sector	Average in tonnes	Per cent	Average in tonnes	Per cent	Average in tonnes	Per cent
Direct emissions	2.71	20.2	5.71	19.8	2.88	20.2
Indirect emissions	10.69	79.8	23.19	74.0	11.39	79.8
Domestic energy and housing	3.98	26.2	8.17	24.6	4.23	25.9
Food	2.07	13.6	4.54	13.7	2.21	13.5
Consumables	1.83	12.1	4.07	12.2	1.96	12.0
Private services	1.68	11.1	3.73	11.2	1.81	11.1
Transport	3.78	24.9	8.39	25.2	4.04	24.7
Public services	1.78	11.7	4.26	12.8	2.02	12.4
Total emissions and other[a]	*15.18*	*100.0*	*33.22*	*100.0*	*16.35*	*100.0*

[a] Totals include other items not categorized in the table. Source: Gough et al. 2011:9.

Figure 3: Consumption-based emissions



Source: Gough et al. 2011:9.

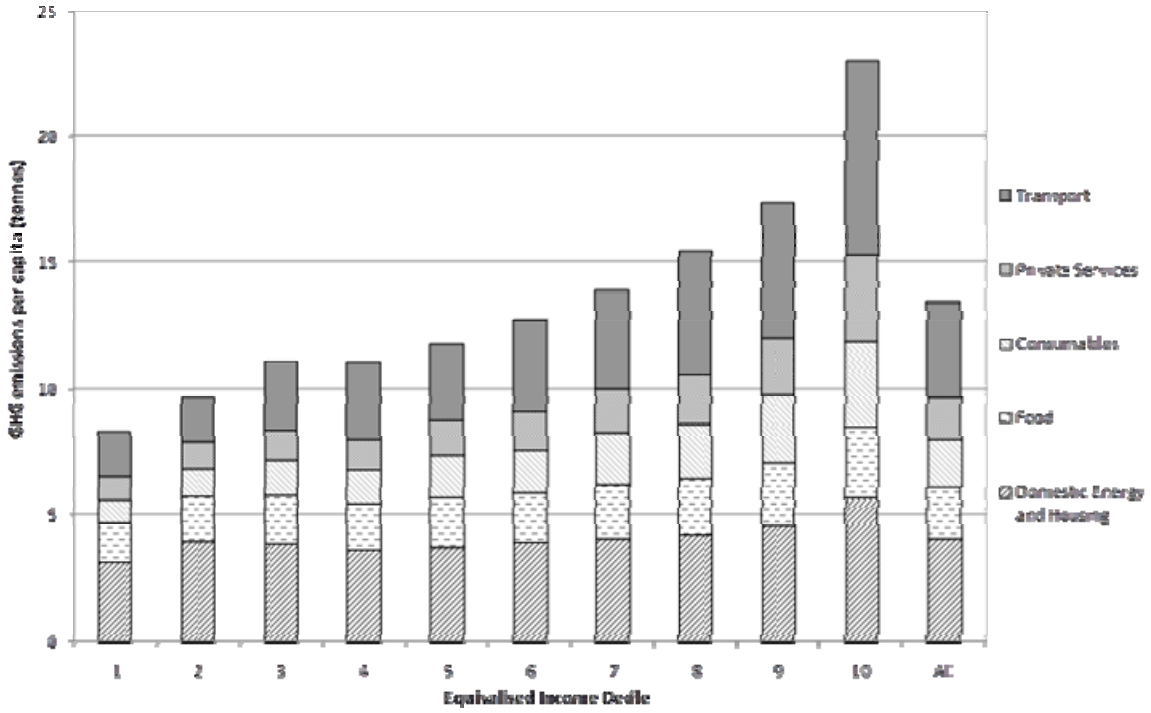
How then are consumption-based emissions distributed within the United Kingdom? I report here a few results from a longer study.[6] To do this two databases were combined: the government's 2006 Expenditure and Food Survey (EFS) and REAP. By linking the EFS expenditure categories to the Classification of Individual Consumption by Purpose (COICOP)

[6] For all details, see Gough et al. (2011); see also Baiocchi et al. (2010); for the Netherlands, see Vringer and Blok (1995); and for the United States, Weber and Matthews (2008).

categories used in the SEI data, I was able to calculate the average per household emissions for each COICOP category.[7]

Figure 4 below presents the distribution of all embodied household emissions by income decile—which are calculated on an equivalized basis to take into account household size and composition. Emissions rise in line with income; in particular, the highest income decile is out of line, emitting 5.7 tonnes per person more than the next highest decile, indicating a long tail of high emitters. Income is significantly correlated with all types of emissions, but much more so with indirect than direct emissions. Comparing the per capita emissions of the highest and lowest deciles, we find these are 4.5 times higher for transport and over 3.5 times higher for private services and consumables, compared with a ratio of only 1.8 for the more basic goods of domestic energy and food.

Figure 4: Distribution of household emissions by income (United Kingdom)

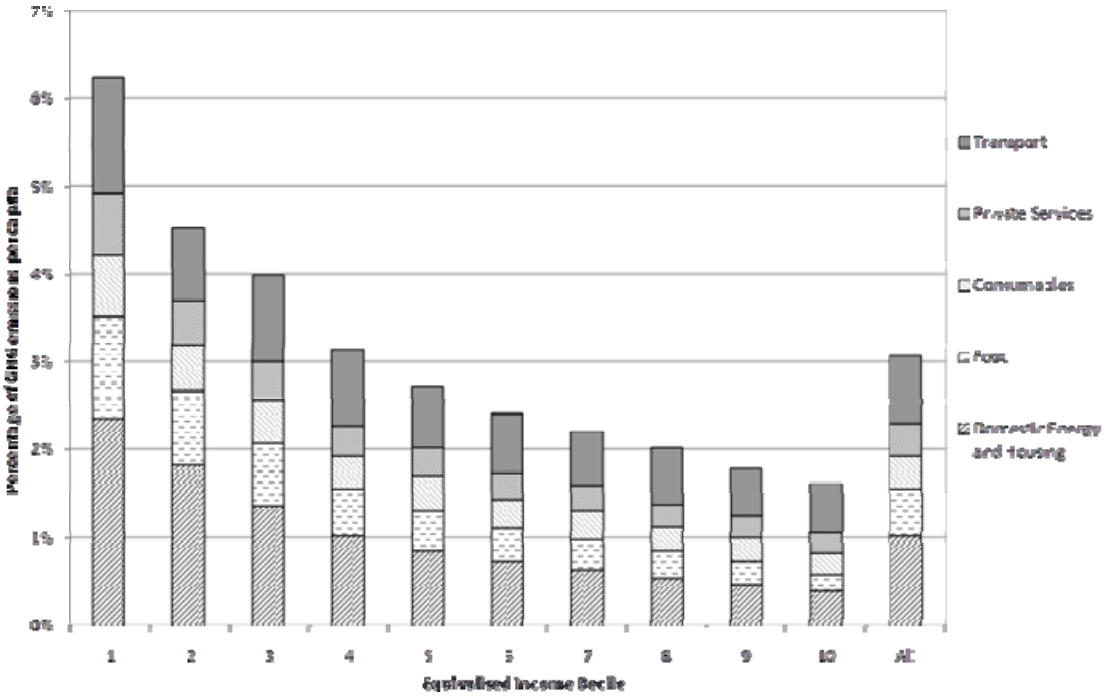


However, if we are concerned with the distributional implications of policies to reduce carbon emissions, we must go beyond total emissions per person to consider the ratio of emissions to income. Dividing average household emissions from all private consumption by average household incomes yields a figure of 3.1 grams CO_2e per pound of income. Figure 5 below then disaggregates this figure by income decile and source of emission. Immediately the picture of rising lines is reversed. Per capita emissions, and all categories of emissions, are greatest in relation to income in the lowest income decile and fall as income rises: the lowest decile emits four times as much in relation to its income as the highest. This simply reflects the fact that inter-decile inequality in incomes (11:1) far exceeds inequality in expenditures and still more emissions (2.8:1).

[7] The values calculated as a result of this approach are per household. Per capita values were calculated by dividing these figures by the mean household size for each household type for each income decile. In doing so, children were treated as equal to adults.

The ratio of emissions per pound declines, as we move from the poorest to the richest decile, faster for domestic energy and housing and food emissions (6:1) than for consumables and services (3:1) and transport (2.5:1), illustrating that the former are necessary expenditures with a lower income elasticity of demand.

Figure 5: Per capita emissions by sector



Other variables (for which we have information) that impact on per capita emissions include household size, household type, housing tenure, and the employment status and hours of work of the household reference person. To disentangle the impact of these, we turn to multivariate analysis, using the log of per capita emissions as the dependent variable. The best fit model is presented in table 3 below (see Gough et al. 2011 for details). This contains just three significant variables—income, household type and employment status—and shows an adjusted R^2 of 0.42, a reasonable figure for a cross-sectional analysis.

The income coefficient is by far the most powerful: an increase of equivalized income of £100 per week or £5,000 per year results in an 8.6 per cent reduction in emissions as a share of income. Type of household is also significant: single householders (of all ages) emit most greenhouse gases per person, followed by two-person households, followed by larger households—due to the absence of economies of scale of consumption. The employment status of the household reference person is also significant: all three groups of workless households—retired, unemployed and unoccupied—experience higher ratios of emissions to income, compared to households with a head in full-time work. The implication of this regression is that any increase in the price of carbon will bear most heavily on low-income, single-person and workless households.

Table 3: Impact of per capita emissions by household type

Log per capita GHG emissions	Coefficients	Standard error	T-statistic
Intercept	-3.12494	0.032	-96.36
Equivalized income	-0.00086	0.000	-43.29
Households with two or more people aged 60+	-0.13555	0.023	-5.90
Households with only one person under 60	0.02588	0.032	0.81
Households with two adults, no children	-0.12882	0.029	-4.38
Single parent households	-0.36312	0.036	-10.21
Households with two+ adults, and children	-0.42225	0.030	-14.23
Households with three+ adults, no children	-0.27472	0.033	-8.26
Part time employed	0.13416	0.024	5.51
Retired	0.13873	0.028	5.02
Self employed	0.20633	0.024	8.77
Unemployed	0.35095	0.048	7.26
Unoccupied	0.31779	0.022	14.13
Adjusted R^2 =0.421			

Thus the analysis confirms but modifies previous findings for direct emissions. All forms of consumption expenditure and hence emissions rise with income, but at a lower rate than incomes rise. The emission elasticities of all the large categories investigated are less than one. Thus any rise in carbon prices, when generalized throughout the economy, will hurt lower income households more. However the degree of regressivity varies according to the category of private consumption expenditure. Expenditures on, and emissions from, domestic energy and food take a proportionately higher share of incomes lower down the income scale than spending on and emissions from transport, consumer goods and personal services. If a way could be found of raising the price of carbon and greenhouse gases embodied in all consumption goods and services, then the result would still be regressive, but not as regressive as current government policy which operates mainly by raising the cost of domestic gas and electricity.

We also find that the dispersion of indirect emissions within income groups is less than the dispersion of direct emissions. It will be recalled that the great variation between households in domestic emissions makes compensation very difficult. Our findings suggest it would be easier and more effective to compensate households for the impact of a rising carbon price affecting the whole basket of consumption goods.

Social policy implications

How can the goals of carbon mitigation and social equity be reconciled when our attention turns to all consumption-based emissions? All the alternative policies discussed in the previous section are directed toward direct carbon emissions, not to the much broader swathe of indirect emissions from all personal consumption.

If we wish to target all embodied greenhouse gases using economic incentives, there are two alternatives: broader carbon taxes and broad-based upstream cap–and-trade system such as the EU Emissions Trading System (ETS). Various proposals for carbon taxation could yield more equitable outcomes, but this will depend on how the revenue is spent and how wide the carbon tax net is—the inclusion of aviation, in particular, improves its progressivity (Green Fiscal Commission 2009). If we want to move seriously to tracking and curbing total carbon

consumption within the country, and not simply carbon production, this will require charging or taxing the carbon content of imports. The ETS applies across the European Union so it should rule out major emission avoidance across the 27 member states; but it cannot prevent the export of emissions outside the European Union. To counter this requires some form of "border levelling". This raises big issues which cannot be considered here. However, a joint report from the United Nations Environment Programme and the World Trade Organization (UNEP–WTO 2009) was positive about the acceptability of border measures to level the playing field between firms subject to national carbon or energy taxes and importing firms subject to less stringent environmental regimes.

The inability of existing policies to reduce the emissions embodied in the high consumption of Northern societies means that more radical policies will be required. I contend that these will need to integrate climate mitigation and social justice goals more explicitly and directly. Three options are considered here: personal carbon allowances and trading, reduced working time, and taxation of consumption and income.

Personal carbon allowances and trading (PCAT) would tackle the distributional dilemma head-on by instituting a form of universal carbon rationing coupled with trading. There exist a wide variety of such proposals, but all entail a cap on a country's total GHG emissions (decreasing year by year) and a division of this amount into equal annual allowances for each adult resident (usually with a lower allowance for each child; Environmental Audit Committee 2008; Fawcett and Parag 2010). In effect, a dual accounting standard and currency is developed—energy has both a money price and a carbon price. Those who emit less carbon than the average could sell their surplus and gain, while higher emitters would pay a market price for their excess. Advocates claim many benefits: a PCAT scheme covering domestic energy, road fuel and air travel would be on average quite progressive; it would make real the carbon rationing required and could bring about behavioural change more directly and quickly. It could be implemented using personal carbon cards and smart metering, though the administrative difficulties should not be underestimated. In effect it would constitute a carbon form of the Basic Income idea, whereby every citizen receives as of right an unconditional regular income at something approaching subsistence level (van Parijs 1992). It could have similar benefits by redistributing income while not harming disincentives to work; indeed it would likely have more legitimacy than a basic cash income.

PCAT would be inherently progressive, so it overcomes the distributional dilemma inherent in mandated markets and carbon taxation. However, it does not avoid all issues of fairness, for example, those living in inefficient or underutilized housing, dependent on car travel, or with special needs. Too many exceptions to the standard allowance could undermine the scheme, but too few would result in rough justice, which could undermine public support (in addition to the political risks of such an overtly redistributive project). For these and other reasons, the UK government in 2008 abandoned its plans for testing the idea. A recent series of studies considered it a suitable future framework for delivering long-term, sustainable cuts in carbon emissions in a way that other policies cannot. However, its integration into the existing policy landscape, notably upstream carbon trading schemes like the ETS, raises problematic questions which differ from country to country according to their energy sources, transport infrastructure, and other factors (Fawcett and Parag 2010). Moreover PCAT plans only to target domestic energy and transport, and it is difficult to see how they could be extended to include the carbon content of supermarket goods and the myriads of services in a modern economy. They would not help address the wider consumption-based emissions discussed here.

A second radical policy is to reduce working hours, and thus incomes, expenditures, consumption and emissions. For the past two decades, the dominant activation policies within the European Union have been designed to raise the proportion of the working age population in paid work; this policy would reverse that. There are two potential links between reduced working time and reduced carbon emissions. The first is the direct effect of lowering incomes and expenditure. The second is the potential for more home production to compensate for less

purchase of commodities coupled with an assumption that the former is for various reasons less carbon-intensive. So far there is little clear evidence on this (though see below and NEF 2010). Some recent studies have demonstrated the reduction of emissions achievable if average work time was cut in the long term to 30 hours a week (Nässen and Larsson 2011) or by a factor of 20 per cent (Pullinger 2011). The latter revealed an overall fall of 4 per cent-6 per cent in household emissions, concentrated mainly in higher income groups.

If we assume continually rising levels of productivity, this amounts to taking more of these increments in the form of rising leisure rather than consumption. Average hours worked per year in 2003 varied between 1,817 hours in the United States and 1,429 hours in the Netherlands, though both were close together two decades earlier. All other things being equal, the Netherlands has deployed its productivity dividend in a less environmentally harmful way than the United States. A similar point is illustrated in the modelling of hypothetical carbon reduction policies in the US up to 2050 by Jorgenson et al. (2010). These policies, they estimated, would reduce real US GDP by 4.1 per cent (compared with business as usual), but household full consumption—which includes the value of leisure—would fall by only 0.3 per cent.

Several countries have initiated experiments in reducing work time. Between 2000 and 2008 the French government operated a maximum working week of 35 hours, which did not have the entirely negative consequences often attributed to it (Fagnani and Letablier 2004). The present Belgian Time Credit Scheme enables workers to accumulate rights to career breaks and so on. More radical proposals have been developed by NEF (2010) and Schor (2011). This policy shift would raise other distributional problems, including the risk of increasing poverty among the low paid and trade union opposition to its impact on earnings in all income brackets. Moreover, given that high income groups would have a greater capacity to reduce work hours without harmful effects, another outcome would be growing time inequality. There is already evidence that some households are both income-poor and time-poor (Burchardt 2008); to simply enact that working time be reduced across the board would worsen this dilemma for low-income families.

To avoid shorter working time policies worsening inequalities in time pressures, they would need to be complemented by a third, more traditional goal of (some) social policies: to redistribute consumption, income and wealth. There are several ways that global warming strengthens this rationale: if everyone is being asked to watch their carbon footprint, then the luxury consumption of the rich will fall under the spotlight; since the conspicuous consumption of the affluent is about positional goods and helps drive fashion, it would be disproportionately important to curb excesses; and there is evidence that large income inequalities erode the social solidarity required for an active public policy oriented to deal with common problems such as climate change. The traditional redistributive case for welfare states is enhanced in a future of radical climate change mitigation (Gough and Meadowcroft 2011).

Yet these are harsh times for the political economy of redistribution, with inequality high across the OECD, and a group of countries, notably Canada, United Kingdom and the United States, becoming so extreme in income and asset inequality that some contend they constitute a novel form of capitalism labelled plutonomy (Citigroup Global Markets 2005). Furthermore, according to Hacker and Pierson (2010), the US political system has been hijacked by the super-rich, so the difficulties of reversing course are greater still. Nevertheless, I continue to believe that the system contradictions within carboniferous and financialized capitalism are growing (Gough 2010). The promise of green growth is that a political coalition built around low carbon growth, energy security and sustainability may provide a lasting impetus for a new industrial revolution safeguarding both the future of the planet and social justice (Gough 2011).

Conclusion

In a post-Kyoto world, the total consumption of affluent societies would need to be constrained and the emission reductions needed would be half as great again as the target to cut by 80 per

cent by 2050. If, in such a world, the double injustice dilemma is to be avoided (within the North), then a radically different welfare system would be needed to integrate the redistribution of carbon, work/time, and income/wealth (NEF2010). At present these issues are mainly studied, and policies developed, within separate silos, but that would need to change. This scenario takes me beyond the scope of this paper. It would require a new economic model to link economic activity to measures of final well-being and sustainability, as distinct from throughput measures such as GDP (Stiglitz et al. 2009).

The welfare states of the second half of the twentieth century flourished in two favourable contexts. First, they were growth states, where continually rising national outputs provided rising revenues to fund social programmes. Second, around the turn of the century, escalating globalization and expanding imports from low wage countries enabled us to export carbon emissions and thus benefit from a yawning GHG emissions deficit. A world of much slower growth in the North and of rising clamour to correct the emissions deficit will pose profound questions for the political economy of twenty-first century welfare states. One thing is certain: they will require profoundly deeper forms of public policy integration combining economic, social and environmental goals and policies in innovative ways (see Gough 2011).

Implications for the Developing World

This paper began by noting the three domains where the double injustice of climate change can be found: between nations on a global scale, within developed nations and within developing nations. I have concentrated on the second, but my argument has implications for the first and especially the third domain.

Double injustice persists at the global level of course, as the refusal of the United States and Canada at Durban to countenance meaningful institutional change testifies. But the faster rate of growth of developing Asia and some other emerging market economies (EMEs) over the past two decades, coupled with severe deflationary prospects in much the North, points to a new era of catch-up and convergence in income levels—relative, if not absolute. This will apply to consumption and emissions too. It will mean that a greater share of the emissions produced in China and other EMEs will be consumed within their borders, rather than incurred to benefit Western consumers. Inter-national inequality is starting to decline (Therborn 2011), and this is being reflected in the changing international distribution of emissions.

However intra-national inequality continues to increase, and this can be observed in most poorer as well as richer countries (Therborn 2011). Thus the issues raised here have direct relevance for double injustice within the developing world. As China and others prepare to participate in a post-Kyoto institutional framework to regulate GHG emissions, it will be essential to ensure that the burden of carbon and other cuts is not imposed on the poorest. For example, the poorest fifth in India have enjoyed hardly any growth in income in the last decade and no improvement in the frightening proportion of underweight children. It is unlikely that these groups are driving India's fast-rising emissions; but the first need is to check this—to undertake similar research into the distribution of emissions by income, household composition and other relevant variables within countries in the South. When this is established, the second requirement is to model the distributive impacts of various policies to restrain GHG emissions, which could draw on the sort of experience in developed economies presented above.

Without such integrated research there is a danger that the pursuit of a green economy and sustainable development will proceed without proper attention to the social dimension and human development.

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UNRISD Occasional Papers on **Green Economy and Sustainable Development**

Paper One **Climate Change, Double Injustice and Social Policy: A Case Study of the United Kingdom**

Ian Gough, December 2011