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Distributional Impacts of UK Climate Change Policies

Research Summary

This study by the Centre for Sustainable Energy (CSE) and the Association for the Conservation of Energy (ACE) has explored the distributional impacts of UK Climate Change Policies by establishing:

- **What needs to be done to meet our renewables target of 15% by 2020;**
- **The proportion of this target to be met through renewable heat, renewable power and energy conservation;**
- **The range and size of technologies required;**
- **The cost of meeting these targets and how they are recovered.**

This study uses CSE's 'Distributional Impacts Model for Policy and Strategic Analysis' – 'DIMPSA'. This model is based on a dataset of household energy consumption, developed from the UK Expenditure and Food Survey (EFS, 2004/05 - 2008), with additional variables modelled from the English House Condition Survey (EHCS, 2006) and Ipsos MORI/Ofgem survey of energy consumer market behaviour. The costs and (where applicable) benefits (in the form of measures) of the following policies have been modelled:

1. EU Emissions Trading Scheme
2. Carbon Emissions Reduction Target (CERT)
3. Proposed Supplier Obligation after CERT
4. Community Energy Saving Programme (CESP)
5. Renewables Obligation
6. Feed-in tariffs (FIT)
7. Renewable Heat Incentive (RHI)
8. Smart meters
9. Product policies

A series of look-up tables and algorithms provide the means for:

1. Modelling the allocation of insulation and renewable energy measures under each of the relevant policies and the associated benefits in reduced fuel bills or FIT/RHI revenues;
2. Distributing the costs of each policy.

For the first stage, the allocation of measures has been modelled using a simple 'exogenous input' method. This approach forces the model to allocate measures at a given rate defined by the user and according to pre-determined household suitability and policy criteria.
In defining the individual policy cost pass-through to domestic consumers, the same assumptions have been applied as those used in the LCTP, with the exception of the RHI and FIT, for which more up-to-date figures were available from DECC based on their latest impact assessments.

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Three scenarios of policy cost recovery are modelled: the first two assume costs are recovered through consumer bills, and the other models cost recovery via income taxation. The cost recovery through bills includes two scenarios: one of an equal 'spread-even' cost distribution; and the second a commercial reality 'supplier' cost distribution.

The model of income taxation is based on taxation thresholds and associated rates concurrent with historical trends for income tax (i.e. the 1980s onwards). The taxation required to fund climate change policies is based on the relative difference between the survey reported income tax payment projected to 2009, and the subsequent additional revenue and baseline scenarios modelled. The impact on consumer energy bills resulting from the modelling are presented in terms of the counterfactual bill. This is the energy bill in 2020 without any of the LCTP policies, but taking account of fuel price rises. The fuel price rise assumptions used in this report match those used by the fuel prices team in DECC, in the distributional impacts analysis discussed in the LCTP Analytical Annex[1]. The non-metered fuel price rise assumptions have been taken from the WWF 'How Low?' report[2].

Results - Distribution of measures

The results of the policy modelling show that nearly two thirds (65%) of households receive at least one measure, with 60% receiving insulation (including cavity wall, solid wall, loft virgin or top-up). One in ten households gets a renewable heat technology, and 3% renewable power.

[1] HM Government, (2009). Analytical Annex. The UK Low Carbon Transition Plan. www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

[2] WWF, (2008). How Low? Achieving optimal carbon savings from the UK's existing housing stock. http://assets.wwf.org.uk/downloads/how_low_report.pdf

Individual policy impact

Analysis of individual policy impact shows that the RHI and RO result in the greatest increase in household energy bills: without the insulation measures available from other policies, which protect households from price rises, the RHI and RO result in an average increase of 7.5% on the counterfactual bill. However, the RHI does appear slightly progressive in nature, resulting in a greater percentage increase for the higher income households. This is related to the distribution of different heating fuels: lower income households rely to a greater extent on electricity for heating and therefore receive less of the policy cost pass-through of the RHI (which is expected not to be recovered through electricity bills).

Combined policy impact

Analysis of all the LCTP policies combined, shows that if policy costs are recovered through consumer energy bills this results in an average increase in household energy bill of £103 in 2020. This is an increase of 8.5% on the counterfactual. Recovering policy costs through income taxation on the other hand sees the average household energy bill decrease by £193 (16% below the counterfactual), with households benefiting from policy measures (insulation and renewable), but not paying the cost through bills. However, under this cost recovery scenario, annual household income falls by an average of £309. Therefore, under the income taxation scenario the average household is £116 'net' worse off, compared to £103 under the 'spread even' scenario (so called because it assumes energy suppliers recover costs evenly across its customer base, rather than loading them more onto certain types of customer (see Section 2.6 of the main report). The spread-even cost recovery through bills scenario results in greater absolute increase in bill for the higher income deciles, but this increase represents a smaller percentage

change, and smaller proportion of household income, than for the lower income households.

Impact of income taxation cost recovery

Taking account of the decrease in energy bill and decrease in household income under the taxation scenario, the lowest income households (decile 1) have on average a net surplus of £96 (i.e. the decrease in energy bill exceeds the decrease in household income), compared to the highest income decile with an average net deficit of £1,378.

The spread-even cost recovery scenario results in some households (22% of the dataset) 'winning' – that is experiencing a decrease in energy bill – whilst some are made extremely worse off.

Alternative tariff solutions

There are alternative methods for recovering policy costs from consumer's energy bills, which have not been modelled as part of the study. The introduction of a 'protected block' tariff represents one possible approach.
A protected block tariff would require regulatory backing to specify that energy suppliers only recover policy costs above a certain threshold for both gas and electricity. For example, the first 2,000kWhs would not be subject to the additional costs of climate change policies but these would be loaded on consumption in excess of this. The remaining units could be subject to either uniform cost pass through or they could escalate, in a similar manner to a rising block tariff, with the unit cost increasing with consumption.
Whilst this approach has not been modelled in detail for this study, high level analysis of consumption patterns suggests:

1. Lower income households generally consume less energy and as such would stand to benefit from bills.
2. A relatively small number of low income households have high levels of energy consumption and would be at risk from the higher priced bands.
3. A higher proportion of low income households heat their home with electricity and could also therefore be made worse off under the block tariff.
4. High consumption low income households could be exempt from the block tariff, to eliminate the risks identified in (ii) and (iii), if they meet certain qualifying criteria e.g. linked to income and electricity tariff.
5. Fuel poor households are on average less efficient which means they theoretically need more energy to heat their homes. A protected block tariff could therefore both increase fuel poverty and simultaneously make people better off.
6. The tariff should not place an undue burden on energy suppliers. For example, the obligation could be split between suppliers based on the consumption of the households they supply rather than total customers.

Conclusions and recommendations

This study has modelled the potential distributional impacts of UK climate change policies, as set out in the Government's Low Carbon Transition Plan. It explores and compares the impacts of recovering policy costs through consumer bills and via income taxation.

The use of energy bills to recover the cost of climate change policies appears more regressive than the alternative use of income taxation. These approaches both require the population to pay for a variety of measures

from which they may or may not benefit. The 'winners' see an overall reduction in their energy bills under either scenario, with the income taxation route benefiting those on lower incomes.

However, current and future Governments are unlikely to use income taxation to fund these measures unless an alternative revenue stream can be found for the country's huge structural deficit. If energy bills are the principal route for the recovery of climate change policy costs then the delivery of the LCTP and the HEMS – or its successor with the new Government – must be designed to be as fair as possible. The HEMS and the LCTP's delivery must therefore:

1. **Ensure no fuel is unduly burdened by climate change policy costs.**

Electricity prices are set to increase by over 4p/kWh by 2020 which is more than any other fuel. Whilst this increase relative to today's costs may be proportionally lower than that experienced by gas consumers, those heating their homes with electricity will face significantly higher energy bills. Such households are concentrated in the lower income deciles.

2. **Ensure expenditure on measures is linked to the householder.**

The HEMS provides further details on the Government's proposals for low interest loans and the possibility of mandatory standards for rented housing. The use of loans and regulation provides the potential to remove the link between policy costs and energy bills. For example, low interest loans will link the cost of measures and their repayments to the property and as such remove the need to place a delivery obligation on the energy suppliers. However, low interest loans will not be appropriate for all householders, particularly those on low incomes that currently under heat their homes and as such will not generate the necessary financial savings to make the loan repayments. The delivery of measures to low income households will therefore require grants and subsidies; the analysis undertaken in this study would suggest this would be most fairly funded from income taxation.

3. **Design tariffs that penalise high consumers and control energy supplier cost pass through strategies.**

The recovery of the costs of climate change policies should penalise those consumers that pollute most. If energy bills are to be the primary cost recovery mechanism then tariffs should be structured to favour those who pollute least and energy suppliers should not be left to recover these policy costs as they see fit to meet their own commercial objectives, rather than to serve wider societal objectives such as reduced inequalities. The report has identified a 'protected block' tariff as a potential solution to this problem. The implementation of this tariff would have its own set of distributional impacts i.e. potentially unduly impacting on low income households using electricity to heat their homes. The tariff would therefore need to be structured to account for different payment methods, (e.g. economy 7), and customer types (e.g. households in receipt of certain means tested benefits with low incomes).

For more information

The full report can be downloaded from the eaga Charitable Trust www.eagacharitabletrust.org and CSE www.cse.org.uk websites.

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