towards sustainable energy tariffs

a report to the National Consumer Council by the Centre for Sustainable Energy

by William Baker and Vicki White

NCC National Consumer Council

Making all consumers matter

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About NCC's affordable and sustainable energy project

This report is part of NCC's affordable and sustainable energy project. Our project adds value to the energy policy debate by bridging the social and environmental challenges associated with fuel poverty and climate change. We aim to promote policies and practices that make sustainable energy choices easier for consumers, as well as ensuring that consumers - especially disadvantaged consumers - can afford an adequate energy supply. NCC's affordable and sustainable energy project is led by Cassie Higgs (c.higgs@ncc.org.uk).

Published by the National Consumer Council
July 2008

PD 30/08

Edited by: Toby Hopwood

About this report

NCC commissioned the Centre for Sustainable Energy (CSE) to produce a report that assesses energy tariffs against the three pillars of sustainable development: economic efficiency, environmental sustainability and social justice. The assessment builds on the criteria used in NCC's report on water charging: Towards a sustainable water charging policy.

The report is written by William Baker and Vicki White. The content of the report and the views expressed within it are those of the authors.

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Acknowledgements

NCC and the Centre for Sustainable Energy would like to thank the following for contributing their time and perspectives to research development and review:

Sarah Darby, Oxford University; Judith Ward, Sustainability First; and others, including colleagues at NCC.

We would also like to thank those that were interviewed for this research. Please see appendix A.

Contents

Foreword

In the UK, the government has acknowledged that there is an urgent need for substantial reductions in UK greenhouse gas emissions in order to combat climate change. As part of the package of policies to tackle climate change, the government has required energy suppliers to deliver energy efficiency and carbon saving measures to a proportion of UK households. The government has made it clear that an environmental obligation on energy suppliers will remain until at least 2020.

However, from 2011, the focus of this obligation may shift from a measures-based approach to one based on outcomes: reducing the overall level of carbon or energy consumption in the household sector. This potential change in focus recognises that, as more and more households benefit from energy efficiency and carbon abatement measures through existing programmes, it will become much harder to find cost-effective options to achieve carbon savings. There will be a need to reduce consumers' energy consumption by changing the way people use their energy.

Modifying tariff structures is one way suppliers could give customers an incentive to use less energy and therefore meet the Supplier Obligation. However, the range of different household energy tariffs offered by energy suppliers does little to encourage energy efficiency or to reward customers for reducing their energy use. The same is true for social justice: most tariffs currently on offer by energy suppliers are regressive and fail to ensure consumers have equitable access to energy services.

So, NCC has commissioned the Centre for Sustainable Energy (CSE) to undertake a study that assesses both current and possible future energy tariffs against the three pillars of sustainable development: economic efficiency, environmental sustainability and social justice. The report concludes by highlighting the tariffs which, in creating a better balance between the three pillars of sustainable development, would be the most sustainable.

NCC welcomes the report from the Centre for Sustainable Energy, which is designed to bring a fresh insight to the debate on energy tariffs – especially relevant given the twin challenges of fuel poverty and climate change, plus rapidly rising energy prices. We hope the assessment and suggested way forward are useful for government, Ofgem, energy suppliers and other stakeholders, making sustainable energy tariffs a step closer for UK consumers.

Cassie Higgs, Senior Policy Advocate
National Consumer Council

Summary

The National Consumer Council (NCC) commissioned the Centre for Sustainable Energy (CSE) to produce an expert paper on sustainable energy tariffs as a contribution towards NCC's 'affordable and sustainable energy' project. This report presents CSE's findings. The report evaluates a range existing and possible future energy tariffs against a set of sustainability criteria. It also identifies options for developing more sustainable energy tariffs in the British energy market.

The research methodology consisted of an extensive literature review, interviews with key stakeholders (see appendix A) and a qualitative evaluation of nine different tariff structures against a set of sustainability criteria (based on the criteria developed by NCC to assess water charges in the publication: Towards a sustainable water charging policy). The criteria were designed to reflect the three broad pillars of sustainable development, namely economic efficiency, environmental sustainability and social justice. The tariff structures were evaluated against the sustainability criteria and allocated a score between one and five, with one representing the lowest score and five the highest. The evaluation also assessed the tariffs on their implications for consumers and whether regulatory or other intervention might be required.

The table below summarises the results of the evaluation:

Tariff	**Economic efficiency**	**Environmental sustain-ability**	**Social justice**	**Level of intervention required**	**Consumer implications: all consumers**
Standard[1]	3-4	2	1-2	N/A	N/A
Social tariffs					
Current	3	2	3	Stakeholder pressure	Minimal
Future	2	3	4	Significant	May depend on extent of cross subsidy
Reduced consumption					
Current	3	3	2	N/A	Minimal
Future	4	4	2	Cap & trade Supplier Obligation	Will require consumer education
Green tariffs					
Current	1	1	1	N/A	Minimal
Future	1	3	1	Minor	Minimal
Feed-in	2	3-4	2-3	Significant	Depends on whether all consumer groups benefit
Rising block	1-2	4	3-4	Extensive	Will require consumer education
Time of use	4	3	2	New consumer protection required	Will require consumer education

1 Includes tariffs with a standing charge, tariffs without a standing charge and capped tariffs.

The evaluation concluded that there is no 'silver bullet' for addressing sustainability through tariffs. No one tariff structure scores highly on all three pillars of sustainable development. A combination of approaches is therefore necessary to improve sustainability, both through tariff and non-tariff policies. Policies external to the energy market are also required.

The report concludes by setting out the policy outcomes that might be sought in designing future tariff structures. These include affordable energy; penalising energy profligacy; incentives to reduce consumption; and engaging consumers with their energy consumption.

The report identifies three possible options for meeting these outcomes, plus one 'cross-cutting' option. The first option involves further development of existing policy in which attractive 'reduced consumption incentive' tariffs are offered to more affluent consumers, and meaningful social tariffs to lower income consumers. The option would require a Supplier Obligation that incentivises suppliers to reduce consumption among their consumers, and the introduction of mandatory minimum standards for social tariffs.

The second option involves mandating suppliers to structure their tariffs so that the first block of consumption is offered at a relatively low rate, and subsequent blocks offered at increasing rates. This allows recovery of lost revenue from the lower rate first block, and provides funds for low carbon measures. The option would require regulation of tariff structures; parallel protection measures for low-income consumers with high levels of consumption, either through social security or exemption from the block structure; and redesign of the Carbon Emissions Reduction Target/Supplier Obligation scheme.

The third option involves the government introducing step VAT rates for increasing blocks of energy consumption. The government would set the consumption thresholds, which would simply be passed on by the suppliers. The policy would have a similar effect to rising block tariffs but would have less impact on competition, since it would not require reregulation of tariff structures. The option would also require parallel protection measures for low-income consumers with high levels of consumption, either through social security or exemption from the higher VAT rates, and the expansion of existing support programmes for low carbon measures.

Cross-cutting options include the introduction of a feed-in tariff for small-scale renewable electricity and heat generation, with receipt of the tariff conditional on investment in energy efficiency measures (whether or not there is a client contribution to such investment). The government and the financial and energy industries should also develop finance packages that make it easy for 'able to pay' consumers to invest in more expensive insulation, heating and other low carbon measures. These could be integrated with energy bills, i.e. through energy service packages, or provided separately, for example, through green mortgages, equity release or low interest loans.

The government should also provide increased funding for capital investment in energy efficiency, heating and other low carbon measures in the homes of low-income consumers through Warm Front

(and Devolved Administration equivalents), social housing programmes and community schemes. It should aim for all homes to be brought up to the same low carbon standard, regardless of funding source.

Introduction

Energy, climate change, fuel poverty and current tariff structures

It is now widely accepted that a two degree rise in average global temperature is a critical threshold, beyond which dangerous climate change will become inevitable. The UK is on course for meeting its binding Kyoto 2010 target of a 12.5 per cent reduction in greenhouse gas emissions, relative to 1990. However, it is unlikely to meet the domestic target for a 20 per cent reduction in CO2 emissions over the same period **[1]**.

In the UK, household demand for electricity and gas has grown consistently over the past three decades due to rising living standards, increased appliance use and smaller household size **[2]**. These trends are unsustainable in the context of the urgent need for substantial reductions in UK greenhouse gas emissions. Two possible responses arise:

1. reduce household demand for energy by changing consumer behaviour and improving the thermal efficiency of our homes and the electrical efficiency of lights and appliances; and
2. develop lower carbon sources of heat and power to meet household demands.

While it is inevitable that a combination of these approaches is required to achieve the necessary scale of emissions reductions, demand management offers more cost-effective and rapid solutions in the short term. Eliminating the wasteful household use of energy has lower up-front investment costs and immediate paybacks in the form of cost reductions.

However, the price signals that result from the current structure of Britain's household gas and electricity tariffs do not encourage demand reductions – in fact, they tend to reward higher consumption, since on average, the more we use, the less we pay per unit of consumption. This has negative environmental and social consequences, since:

- The marginal cost of producing more carbon emissions reduces as consumption increases, even though the environmental cost of that activity does not reduce.
- Those who can only afford to buy less pay more per unit of consumption, reinforcing the existing income disparities that underpin fuel poverty **[3]**.

Thus, current household gas and electricity tariffs send price signals to consumers that are directly opposed to their own basic needs for affordable warmth, or to the wider need to stimulate lower energy consumption.

There are, however, commercial reasons why energy supply companies currently structure their tariffs in this way **[4]**:

- The marginal cost of supply of energy reduces as consumption increases, since there are many fixed costs of supply (such as billing, meter reading, delivery infrastructure).
- Regulatory approaches favour 'cost-reflective' pricing and act against cross-subsidies between groups of customers.
- The current regulatory structures for the delivery infrastructure (pipes and wires) tend to be volume-driven (providing incentives for maximising their use).
- The costs of environmental damage are not carried by those who cause them.

The dramatic rise in fuel prices over the past five years has also highlighted the distributional impact of current tariff structures. The differentials between Direct Debit, standard credit and prepayment meter tariffs have been a feature of the competitive energy market from the very outset of liberalisation, with the more recent development of online tariffs leading to further differentiation. These differentials are regressive in that low-income consumers are less likely to have access to online facilities, bank accounts or a sufficient financial 'cushion' to use Direct Debit facilities. High fuel prices – a feature that is likely to remain for the foreseeable future – have thrown these inequalities into sharp relief. However, suppliers argue that the rates associated with each payment method reflect different 'costs to serve'.

This report considers the sustainability of energy tariffs. It evaluates a range of tariffs, both existing and possible future tariffs, against a set of sustainability criteria developed by NCC to assess water charges in the publication: *Towards a sustainable water charging policy*. It also:

- provides a brief overview of the current energy market in Britain from a sustainability perspective;
- discusses policies for encouraging sustainability in Britain and Europe; and
- identifies options for developing more sustainable energy tariffs in the British energy market.

Defining 'energy sustainability'

The National Consumer Council defines sustainability as encompassing three broad pillars, namely economic efficiency, environmental sustainability and social justice **[5]**. When applied to energy, a useful definition is as follows:

'Sustainable energy is about meeting consumers' current needs for energy services in ways which do not compromise the ability of future generations to meet their needs'.

The definition encompasses the notion of providing secure and affordable energy services which minimise environmental impact, both for current and future generations.

It is often argued that there are major tensions between the three pillars. For example, increasing the price of energy to encourage energy conservation and other carbon reduction measures leads to increased fuel poverty, as fuel becomes less affordable for low-income consumers. However, another way of considering the three pillars is that they should act as constraints on one another. This report starts with the premise that the three pillars should be aligned and in balance, but that economic efficiency is currently by far the most dominant driver of tariff structures. The report therefore considers how future tariff policy might better align the environmental and social justice pillars with the economic efficiency pillar.

Research methodology

The research carried out for this report involved a literature review, a qualitative evaluation of tariff structures and interviews with selected stakeholders. A draft summary of the evaluation was sent to stakeholders prior to interview. The evaluation presented in this report incorporates comments from stakeholders on the draft evaluation. The results of the research were then used to inform recommendations for possible ways forward.

The report structure

The report is structured as follows:

Section 2 - Tariff design – context. This section gives an overview of the broad constituent elements of current energy tariffs and the extent to which they reflect economic, environmental and social factors.

Section 3 - Tariff evaluation. This section evaluates nine different categories of energy tariffs with respect to the extent to which they meet sustainability criteria, based on the results of the literature review and interviews with stakeholders.

Section 4 - The way forward. This section makes recommendations for developing more sustainable tariff structures, based on the results of the tariff evaluation and interviews with stakeholders.

Appendix A – Interviewees. This lists the stakeholders interviewed for the research.

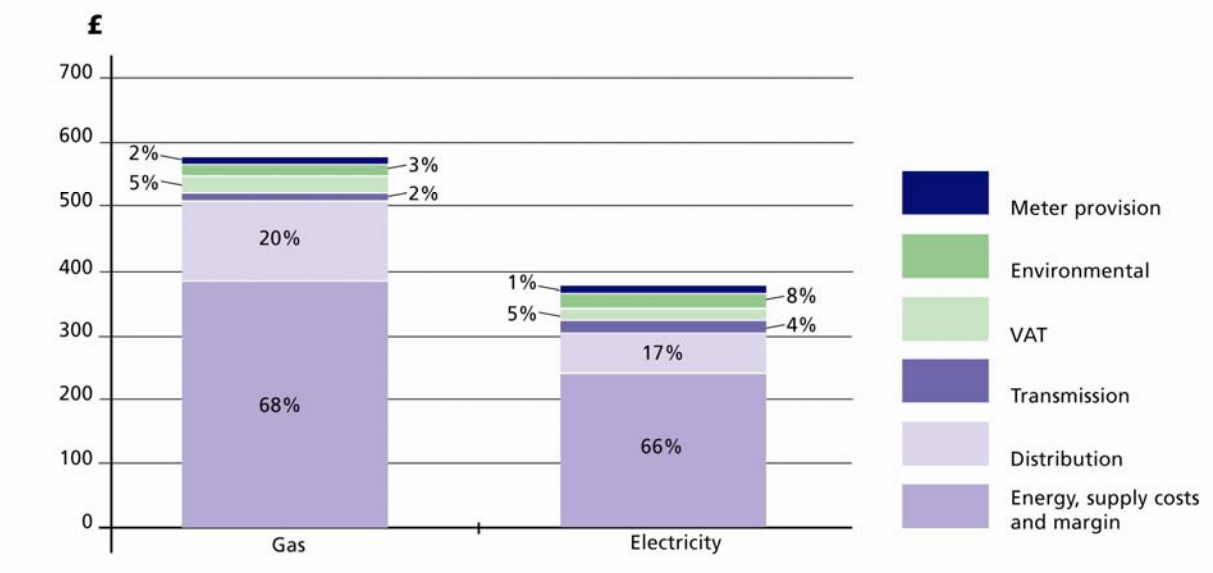
Appendix B - Energy tariffs and sustainable energy. An overview of the British energy market with respect to historic context, liberalisation, policies for encouraging sustainability and the European context.

Tariff design: context

Background

Energy tariffs are constructed to recover a range of costs. Figure 1 below gives an approximate guide to the current breakdown of gas and electricity bills:

Figure 1: Breakdown of gas and electricity bills



Source: Ofgem (2008a)

The category 'energy, supply costs and margins' represents the bulk of supplier costs. Unfortunately, Ofgem is not able to provide any further breakdown of these costs, in part because the constituent elements vary between suppliers and in part because of commercial confidentiality. They include the following elements:

- purchases from the wholesale gas and electricity markets;
- balancing and settlement costs;
- data transfer;
- call centre costs;
- billing and meter reading;
- account management;
- marketing, advertising and Corporate Social Responsibility; and
- consumer recruitment and retention.

The six companies that dominate the British energy market are 'vertically integrated': they combine supply with generation and/or gas production and storage. This helps companies reduce the risk

associated with wholesale purchases and load balancing. The supply cost element (billing and customer interface) represents a relatively small part of the total energy price, perhaps five to ten per cent **[6]**. The economic, environmental and social issues relating to the structure of energy tariffs are discussed in more detail under the following headings.

Economic issues

There are a number of business drivers for today's vertically integrated supply companies. They include:

- consumer recruitment and retention;
- cost to serve;
- cash management;
- trading and load balancing risk; and
- the link to generation/production asset investment.

It is useful to consider these drivers in more detail.

Consumer recruitment and retention is perhaps the most important driver for today's energy suppliers, more so than volume of energy sold. This is because it provides a solid and predictable foundation for investment in new electricity generation and gas assets and reduces the cost per consumer of largely fixed IT development costs. For example, acquiring (or retaining) just one additional residential customer will probably add (or retain) 3,500 kWh of electricity sales and 20,000 kWh of gas sales per year. This is equivalent to persuading 50 customers to increase their consumption by two per cent.

There are considerable incentives on suppliers to reduce consumer 'cost to serve'. This can take place through consumer self-management (for example, internet billing and self meter reading), IT improvements and improvements to customer service (which reduces call centre and other costs in addressing complaints). Reductions in 'cost-to-serve' will have a greater impact on profitability than small increases or decreases in sales volume. This is because any cost-to-serve savings directly benefit the energy supplier business, whereas the margin made on additional volume is very slim (and may also cause some instability in the generating and trading business).

Companies need a stable customer base with predictable load shape and consumption patterns, and a reliable generating portfolio sized to 'fit' the customer base. This reduces the significant financial risk of having to meet demand by buying electricity on the 'open market' at unpredictable prices (and from competitors). It also reduces the 'balancing risk' associated with the electricity trading system (a balancing risk creates a hefty cost for mismatching anticipated demand and supply).

The stable purchasing power of the supply business also provides the foundations for financing investment in new capacity in the generating business. The generating business can be confident in securing the full value of the generated electricity – not the case if the financing has instead to rely on a power purchase agreement with another supplier. The same is true of gas, except that the level of vertical integration in gas supply is less than that in electricity. However, gas suppliers have faced significant financial risks over the last two years due to volatile prices and unusually mild, low demand winters. Many of the suppliers' parent companies are therefore likely to invest in upstream gas production and/or storage assets over the next few years to reduce their trading risk. This puts them on both sides of the market, with respect to selling and buying gas.

In conclusion, today's energy suppliers are ultimately driven by the level of return offered to shareholders. A company generating and selling less energy can be more profitable and produce higher shareholder value than another selling more energy. This can be achieved by investing wisely in upstream generating and production assets, balancing this well with customer demand shape, managing cash prudently, reducing the cost-to-serve through a sound IT and customer management strategy, and retaining customers with positive brand and 'competitive-enough' tariffs.

Environmental issues

Figure 1 illustrates the contribution of regulated environmental costs to energy bills. In the case of electricity, these include the notional costs of the Renewables Obligation, the Carbon Emissions Reduction Target scheme and the European Union Emissions Trading Scheme (see Appendix B for overview of these measures). These represent about eight per cent of average electricity bill costs. In the case of gas, this mainly relates to the notional cost of the Carbon Emissions Reduction Target, which represents about three per cent of average gas bill costs.

While these environmental 'levies' help address environmental externalities, they are not designed to encourage consumers to reduce consumption through price signals. They are also based on a business model in which companies sell units of energy, rather than a combined package of energy services (units of energy, energy efficiency and other low carbon measures). The government and others therefore aspire to transform the current energy market into an energy services market, and regard this as important for achieving carbon reduction targets **[7]**.

The volume of energy sold is not a key driver for today's energy companies, as explained above. This has both positive and negative implications for encouraging more environmentally sustainable energy tariffs. The positive element is that suppliers would not face a profitability crisis should they face centrally imposed constraints on the amount of energy sold. The negative implication is that suppliers will not necessarily develop energy service business models in response to such constraints. This is

because it is questionable whether today's big six companies are capable of making the transformation desired.

For example, there is very little synergy between today's energy supply sector and the insulation and heating sectors. Energy suppliers are dominated by brand management, billing, customer management and energy trading systems. They serve customer bases numbering in their millions and manage this with relatively few staff. By contrast, the insulation and heating sectors are dominated by vans and equipment, logistics, supply chains, semi-skilled labour and health and safety. While there has been some consolidation in the insulation industry over recent years, this is not the case in the heating industry, which is dominated by large numbers of very small operations.

Furthermore, several energy suppliers have tried, and failed at some cost, to establish and deliver an energy services company approach in the domestic market. Such an approach has had more success at a small-scale local level, typically as a result of local authority leadership. It has frequently been adopted by Combined Heat and Power/district heating schemes, which in themselves challenge current business models (communal provision versus atomised, household provision) **[8]**. However, these schemes represent less than one per cent of Britain's energy market and rely considerably on a small number of 'wilful individuals' determined to challenge current orthodoxies **[9]**.

Social issues

It is notable that Figure 1 does not include a breakdown of the various 'social obligations' that suppliers are expected to meet as part of their licence conditions, such as free gas safety checks and meter moves for vulnerable consumers **[10]**. This may reflect the minor costs associated with meeting such obligations. If a more extensive social tariff was introduced, the approximate cost of this could be identified as a separate item on Ofgem's breakdown (see Fig.1).

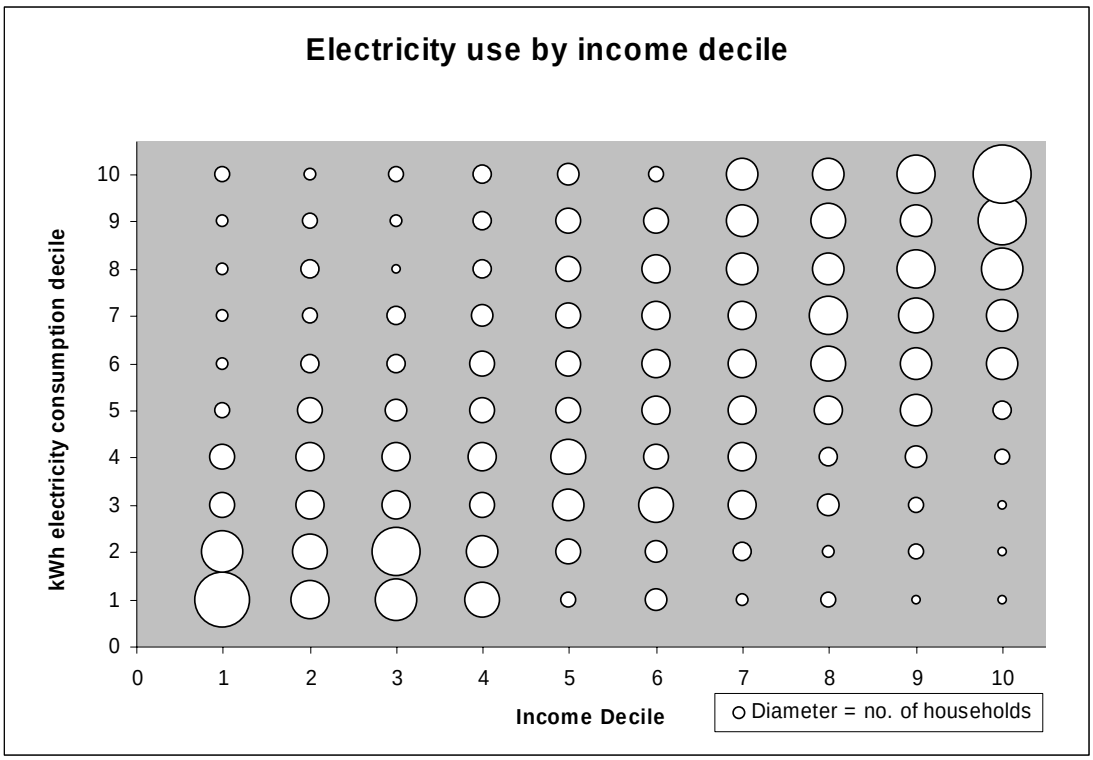
The key supplier cost that does have a distributional impact is 'cost to serve', with the impact being almost entirely regressive. The differential between prepayment meter and standard credit tariffs on the one hand, and Direct Debit and online tariffs on the other, is considerable, and has risen over recent years **[11]**. Suppliers defend this differential as a reflection of the smaller 'costs-to-serve' associated with online and Direct Debit tariffs.

The actual additional costs associated with providing the prepayment facility are contentious. The government has concluded that current additional costs are too high, and has threatened the use of legislation unless suppliers bring them down **[12]**. Regardless of the true extent of the additional costs, it is notable that Direct Debit payers have benefited from an existing, externally funded banking facility which suppliers can offer to those consumers able to take advantage of it. By contrast, the costs of the

prepayment meter infrastructure are entirely internalised within the energy tariff structure and are thus borne by prepayment meter consumers themselves (following the principle of cost-reflective pricing encouraged by the liberalisation process). This differential charging by payment method is undoubtedly regressive, because low-income consumers are much more likely to use prepayment or standard credit methods of payment **[13]**.

Furthermore, low-income consumers tend on average to consume less energy than those on higher incomes (see Figure 2 below). Despite this, lower income consumers spend a higher proportion of their income on fuel than higher income households.

Figure 2: Distribution of electricity consumption across income deciles



Source: CSE, 2007b

Figure 2 also shows that there is a large variation within income deciles which are masked by decile averages. Some low-income households have very high consumption while others have very low consumption. These variations in income-consumption patterns have important implications for developing more sustainable energy tariffs.

Conclusion

This section discussed the influence of economic, environmental and social factors on current tariff structures. The supply cost element (billing and customer interface) represents a relatively small element of the total energy price, perhaps five to ten per cent. It is this element that the report mainly addresses.

Economic efficiency is clearly the main driver of existing tariff structures, with suppliers seeking to increase competitiveness by reducing their costs, thereby increasing returns to shareholders. Environmental sustainability is addressed through regulated 'levies' on bills that fund specific programmes, such as energy efficiency or renewable generation. However, these 'levies' represent 'add-ons' that do little to influence consumer behaviour with respect to reducing demand. Social issues are addressed through regulated obligations on suppliers to provide certain services or improve access to energy supply. Thus, current tariff structures do not intrinsically address environmental sustainability or social justice concerns. This may change with the introduction of the post-2011 Supplier Obligation (see Appendix B).

Evaluation of energy tariffs

Criteria for assessing the sustainability of energy tariffs

NCC's report, *Towards a sustainable water charging policy,* developed a number of criteria for assessing water charges, based on the 'three pillars' for assessing the sustainability of water tariffs **[14]**. We have developed a similar set of criteria for assessing the sustainability of energy tariffs, set out below in Table 3.

Table 3: Criteria for assessing the sustainability of energy tariffs

Economic efficiency	• Full cost recovery • Reflect cost of supplying energy • Ensure energy is appropriately priced at the margin • Provide a balance of incentives for both consumers and supply companies to use energy efficiently • Ensure security of supply
Environment	• Minimise production of greenhouse gas through the generation, distribution, supply and consumption of energy • Provide incentives to consumers to reduce both peak and overall consumption • Stimulate energy companies to promote non-financial measures for saving energy • Encourage consumers to have a 'sense of control' over their energy usage • Ensure costs of 'environmental externalities' are incorporated
Social justice	• Ensure consumers do not ration energy use to the extent that their health, safety and participation in society may suffer • Reflect consumers' ability to pay for the energy services required to meet their essential and 'social norm' needs • Allow consumers to budget their energy payments and pay a 'fair' price for energy services purchased • Ensure consumers have equitable access to energy services

Criteria – issues

The stakeholders consulted during the research were asked to give feedback on the criteria outlined in Table 3. There was general support for the criteria. One stakeholder commented on Ofgem's emphasis on the identification of separate cost centres, cost reflectivity and the elimination of cross subsidies. Many cross subsidies continue to exist in the energy market, for example between urban and rural consumers and between consumers close to gas terminals and those further away. However, the regulator is reluctant to take action against the prepayment meter surcharge, because it is considered cost-reflective. Cost reflectivity is not the same as full cost recovery. It is possible for a company to recover the full range of costs of providing a service without all the separate costs associated with that service being fully cost-reflective. Commercial firms in many sectors outside energy maintain cross subsidies without this causing concern.

One stakeholder questioned the 'ability to pay' criterion, arguing that it implied certain costs were suppressed for low income groups and were therefore not cost-reflective. The stakeholder thought this raised an important issue about whether 'ability to pay' should be addressed within the energy system or through wider social policy, perhaps as part of the benefit system. The government is clear that social and environmental costs should be dealt with through a combination of measures that are both internal and external to the energy market. However, a number of commentators, both within the energy industry and those representing low-income consumers, have expressed concern that the government places undue emphasis on energy market solutions to wider social problems **[15]**.

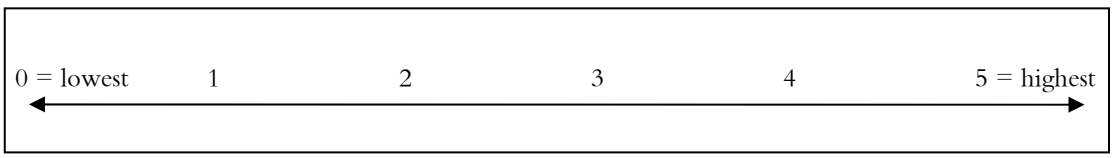
'Scoring' sustainability

The evaluation assessed nine energy tariffs against the sustainability criteria listed in Table 3:

1. tariffs with standing charge;
2. no standing charge tariff;
3. capped tariffs;
4. social tariffs (including Staywarm, a fixed price tariff);
5. reduced consumption incentive tariffs;
6. 'green' tariffs;
7. feed-in tariffs;
8. rising block tariffs; and
9. time of use tariffs.

The tariffs evaluated include both current (for example fixed unit and capped tariffs) and possible future tariffs (for example feed-in, rising block and 'time of use' tariffs). Some tariffs, such as social and reduced consumption incentive tariffs, while in existence today, may become more important in the future.

The nine tariffs selected were scored against the above criteria on a scale of 0-5, as illustrated below (following the approach adopted in the NCC evaluation of water charging).



Some tariffs are given a score range (for example, 2-3) against a particular criterion. This is because the assessment reflects variations within tariff structures. The higher score in the range represents the greatest potential for meeting the criteria if complementary adjustments are made to social support or environmental protection outside tariff structures. Scoring is necessarily crude and does not adequately

reflect the interdependence of the different aspects of sustainability. However, it provides a useful at-a-glance assessment.

The evaluation also assesses the nine tariffs according to their implications for consumers (such as acceptability or consumer protection), and whether any regulatory or other forms of intervention would be required to introduce them.

The tariffs

There are many variations of tariffs within the nine categories selected, with widespread smart metering likely to open up even more. The following gives a brief description of each of the categories and assigns scores for the three sustainability elements. There was a general consensus among stakeholders consulted that the first three tariff structures did not vary substantially with respect to their implications for sustainability. The evaluation therefore scores these tariffs together.

Tariffs with standing charge

This tariff structure is the most common type offered by suppliers in Britain. The standing charge is designed to recover suppliers' fixed costs, such as billing and delivery infrastructure. Price is the main determinant of consumer acquisition and retention, while service differentiation is a minor consideration for most consumers. The tariffs are designed to recover all suppliers' economic costs although they do not reflect all environmental costs. The tariffs are also broadly cost-reflective, although many historical cross subsidies still remain, for example between urban and rural consumers. Suppliers tend to 'smooth out' volatile price swings within the wholesale market for retail consumers. Retail tariffs therefore vary in the extent to which they are cost-reflective of the current wholesale price at any given point in time **[16]**.

The pricing structure does not offer any demand reduction incentive, as units are charged at the same rate (with a few exceptions), regardless of usage.

Unit prices tend to vary considerably with payment method. Direct debit tariffs have traditionally offered a lower average unit price than prepayment meter tariffs. More recently, online tariffs have offered lower rates again. Many low-income consumers cannot take advantage of Direct Debit and online tariffs because they may not have a bank account or a home computer; or if they do have a bank account, are reluctant to risk the bank charges incurred should an automated debit overdraw their accounts. Many also prefer the budgetary control prepayment meter or frequent cash payment options provide.

Some suppliers now offer the same tariff to both prepayment and standard credit consumers, although only one supplier offers this for both gas and electricity. None of the suppliers have equalised prepayment or standard credit tariffs with Direct Debit tariffs, apart from some social tariff offers to a limited number of consumers (see below). Competition for prepay consumers is much less pronounced than for Direct Debit and online consumers. Consequently, prepay consumers are not particularly active market players. Several stakeholders commented on the consumer implications of eliminating the prepayment meter surcharge. It was considered this would push up the prices for consumers not on prepay, many of whom will be on low incomes. It would be useful to establish the precise impact of elimination of the surcharge and possible consumer reaction to such a move.

The standing charge hits many low income users, who tend to have lower than average consumption levels (see Fig. 2). Thus, the standing charge represents a higher proportion of their overall bills. This also applies to second home owners and those with very energy efficient homes with low fuel bills.

No standing charge tariffs

This tariff structure is also common in Britain. Unlike the above tariff, the standing charge is absorbed into a higher unit cost for the first block of consumption. The tariff is slightly more unpredictable for suppliers than the tariff with standing charge, due to the increased risks of not recovering the fixed costs if the boundary between the two blocks is not judged correctly. One stakeholder identified the difference between this tariff and the tariff with standing charge as largely presentational. For example, for consumers with average consumption, there is very unlikely to be a significant difference between bills generated by the two tariff structures. The 'no standing charge' tariff therefore reflects a supplier response to some consumers' antipathy towards standing charges.

The tariff tends to discourage demand reduction consumer behaviour because the unit price decreases with increased energy use. However, consumers likely to benefit from this tariff are those with low consumption levels, despite paying a higher unit rate for the first block. Ostensibly, the tariff should benefit low-income consumers with low consumption. However, such consumers do not tend to actively participate in the energy market and are therefore less likely to take advantage of these tariffs. The higher unit price may also lead to some low-income consumers who have switched to this tariff rationing essential use.

As with the tariff plus standing charge, unit prices generally vary according to payment method and access to online facilities. In this sense, many low-income consumers lose out because of their reliance on expensive payment methods.

Capped tariffs

Capped tariffs offer the consumer a guaranteed price for their electricity and/or gas, until a specified date. Although these tariffs are usually priced slightly higher than non-capped tariffs, they ensure the consumer is protected against any fuel price rises within the specified period while still allowing them to benefit from any price decreases. Suppliers match capped tariff consumers against their long term contracts for energy purchased on the wholesale market. Consumers on capped tariffs are more likely to remain with the supplier, at least for the duration of the capped tariff. The tariff therefore benefits suppliers, given the importance of consumer retention. Capped tariffs can either include a standing charge or incorporate this into the unit price for the first block of consumption. A number of suppliers also now offer fixed tariffs in which the tariff is fixed for a certain length of time, regardless of whether prices go up or down.

When the first capped tariffs appeared on the market they offered substantial savings for consumers. However, suppliers now tend to set a fairly high premium on capped tariffs and offer them for shorter time periods, a reflection of the volatile nature of today's wholesale energy market. Consumers are therefore less likely to make savings in the long term, although the tariffs do offer 'peace of mind' for the duration of the cap. Capped tariffs could benefit some low-income consumers in that their predictability helps with budgeting. However, these consumers do not tend to be active players in the market.

As with the previous two tariff structures, unit prices generally vary according to payment method and access to online facilities. In this sense, many low-income consumers lose out because of their reliance on expensive payment methods.

Economic efficiency

All three tariff structures fully recover suppliers' economic costs and are generally cost-reflective, although many cross subsidies still exist. The extent to which suppliers' prepayment meter tariffs are a true reflection of their actual additional costs is contentious. Capped tariffs encourage consumer retention and therefore provide significant value to suppliers. However, suppliers are less willing to offer long term caps due to the current volatility of the wholesale markets.

Score: 3-4 (depending on view taken on cost-reflectivity of prepayment tariffs).

Environmental sustainability

None of the three tariff structures encourage demand reduction nor reflect the full environmental cost of carbon. However, certain regulated environmental measures are built into the tariff structures, described above under the 'Environmental Issues' heading (these costs are also reflected in all the subsequent existing tariff structures described). This creates tensions with social justice objectives in that

they make fuel less affordable. These tensions will inevitably increase in the future with the rising cost of environmental measures.

Score: 2 (the inclusion of regulated environmental measures increased the score allocated).

Social justice

Higher charges for standard credit, prepayment and 'off-line' tariffs (compared to Direct Debit and online tariffs) have a regressive effect with respect to the many low-income consumers who use these tariffs. The standing charge tariff tends to hit low-use consumers, who tend to be low income. However, the 'no standing charge' tariff effectively means consumers with low consumption are paying a higher unit charge than those with high consumption. Certain regulated social measures are built into tariff structures (for example, a requirement to provide a range of payment facilities). However, their contribution to social justice objectives is relatively minor.

Score: 1–2

Level of intervention required: Not relevant

Consumer implications

Nearly 50 per cent of consumers have never switched supplier, with switching particularly unlikely among low income, vulnerable and prepay consumers. Of those who have switched, many have not switched to the best deal, with a third switching to a deal that left them worse off **[17]**. This suggests that mainstream tariff structures are confusing to consumers and competitive pressures within the energy market are reduced.

Verdict

The three tariff structures are regressive, do not reflect the full environmental costs of energy supply and do not encourage demand reduction.

Social tariffs

Social tariffs vary considerably with respect to the level of discount offered, their eligibility criteria and the number of consumers benefiting **[18]**. However, it is now broadly accepted that the term 'social tariff' only applies when the rate offered is at least equivalent to, or less than, the supplier's Direct Debit rate. Ofgem suggests that social tariffs fall into four broad categories **[19]**:

- a set discount rate which reduces tariffs to a rate equivalent to or less than the supplier's Direct Debit tariff (the Direct Debit/Standard Credit/prepayment differentials are generally retained for these types of social tariff);

- a tariff which is equivalent to the suppliers' Direct Debt tariff (the same tariff is levied regardless of payment method);
- a tariff which is equivalent to the supplier's current best tariff, for example its online tariff (again the same tariff is levied regardless of payment method); or
- a fixed bill tariff for one year regardless of consumption, up to a certain limit, in that year (the one product in this category levies the same tariff regardless of payment method).

While social tariffs specifically target vulnerable households with the aim of helping to reduce their energy bills, the range of tariffs available on the market may mean the 'best deal' is not necessarily a 'social' tariff. Furthermore, there is no social tariff market in the sense that eligible consumers can switch to the most advantageous social tariff that meets their needs. Instead, suppliers either invite existing eligible consumers to switch to the tariff or proactively transfer consumers to the tariff with an option to 'opt out'.

There is considerable pressure on suppliers to provide more extensive social tariffs that are available to a larger number of consumers, particularly within the context of increased fuel prices and the government's difficulties in meeting its Fuel Poverty Strategy targets. The government wants suppliers to offer such tariffs 'voluntarily', while using the threat of legislation if suppliers do not cooperate **[20]**. Others, including three suppliers, believe that more meaningful social tariffs will only come about as a result of a government mandate **[21]**. Whichever route is adopted, it appears likely that suppliers will offer more extensive social tariffs in the near future.

Economic efficiency

Social tariffs are generally less profitable to suppliers, although none of the current offers are 'below cost'. Eon describes Staywarm as a 'commercial product', although some contest whether Staywarm is a 'true' social tariff **[22]**. Social tariffs are ostensibly funded through suppliers' corporate social responsibility budgets, which are designed to improve suppliers' public relations profiles. However, most stakeholders interviewed did not consider that social tariffs had much impact on market share. One stakeholder commented: 'Corporate social responsibility is just a mask for cross subsidy'. Existing social tariffs only involve minor cross subsidy. However, a more extensive social tariff (with higher coverage and offering larger discounts than current products) would entail more extensive cross subsidy and lead to slightly higher prices for the remaining consumer base. Opponents of mandated social tariffs argue that they distort competition and would reduce pressures to keep prices low.

Score 2–3 (3 for current offers, 2 for more extensive mandated social tariff).

Environmental sustainability

Social tariffs are designed to encourage beneficiaries to consume more than they might have otherwise, although low-income consumers tend to have low consumption **[23]**. While this may appear to militate against environmental objectives, it could be seen to be in line with the principle of 'contract and converge' **[24]** (although this would imply parallel measures to reduce energy profligacy among higher income consumers). Most existing social tariffs are offered as part of a 'package', with a benefit entitlement check and provision of energy efficiency measures. A more extensive social tariff is likely to insist that recipients also take up other measures.

Score: 2–3 (3 if extensive energy efficiency measures provided alongside social tariff).

Social justice

Current social tariffs help protect beneficiaries against price rises but cannot guarantee 'fuel poverty proofing'. The number of beneficiaries is much smaller than the number of those in fuel poverty and those finding it difficult to pay fuel bills. A more extensive social tariff would entail higher coverage and larger discounts. Social tariffs are therefore broadly progressive, although Ofgem argues that low-income consumers not eligible for the social tariff would pay higher bills **[25]**. A number of suppliers have highlighted the difficulty of identifying and targeting the fuel poor. Several stakeholders suggested it would be more appropriate for the Department for Work and Pensions to take on this task. This would provide a more precise mechanism for targeting social tariffs and avoid the subjective nature of the current, voluntary approach. The means-testing can be stigmatising for beneficiaries.

Score: 3–4 (3 for most current offers, 4 for more extensive package but only if accompanied by provision of extensive energy efficiency measures).

Level of intervention required

Advocates of mandatory standards for social tariffs argue that intervention would address a long standing failure in the energy market, in that beneficiaries are generally not active market players. However, detractors argue that this would effectively mean 'reregulation' of a section of the market and thus a fundamental shift in government and regulatory policy.

Consumer implications

The extent to which consumers would accept more extensive social tariffs is contentious and this was reflected in the views of the stakeholders interviewed. One stakeholder referred to research by EDF Energy in which 75 per cent of those interviewed accepted that social tariffs were fair and reasonable. Others argued that consumer acceptability is likely to be influenced by the extent of subsidy and coverage provided, with more extensive provision likely to attract greater consumer antipathy. It is assumed that social tariff beneficiaries welcome the tariff, although research has not been undertaken to verify this.

Verdict

Baker's study of social tariffs found that many supporters of social tariffs considered them a 'second best' **[26]**. They were seen as a pragmatic solution to rising fuel prices during the absence of government willingness to provide higher income maintenance measures (such as benefits and pensions). Social tariffs make a minor contribution to social justice and can also address environmental sustainability, if energy efficiency measures are offered alongside them. Social tariffs do not encourage demand reduction, rather the opposite. However, many low-income consumers already have low consumption levels, and a further reduction would damage health and social wellbeing.

Reduced consumption incentive tariffs

These 'tariffs' offer consumers incentives to reduce their energy consumption over certain periods of time. Incentives may include cash-back offers or other financial incentives. The tariffs therefore encourage, to an extent, demand reduction behaviour by consumers. Given that these tariffs are relatively new, it is difficult to assess whether they are having a significant and sustained impact on consumers' energy use.

Two of the six main suppliers now offer reduced consumption tariffs. EDF Energy's scheme offers customers Nectar points for meter reads submitted online, and for reductions in energy achieved from one year to the next. Under Scottish & Southern Energy's (SSE) scheme, consumers can earn 'energy efficiency credits' which can be used towards their energy bills or for installing energy efficient measures. Customers earn credits by reducing their consumption of energy over time, investing in energy efficiency measures and using online billing facilities. Consumers wanting to take up the EDF Energy or SSE tariffs are required to use online facilities and provide 'self-meter reads'. This therefore reduces the suppliers' 'costs to serve'.

EDF Energy and SSE claim that the tariffs signify an important change in approach, from selling units of energy to selling energy services. The companies anticipate the potentially dramatic change to business models that are likely to be encouraged by the introduction of the post-2011 Supplier Obligation (see Appendix B). However, the two tariffs are targeted at more affluent consumers able to take advantage of online facilities. Low-income consumers rarely have 'spare capacity' to reduce their consumption without cutting back on essential use.

Economic efficiency

While the tariffs may appear to reduce suppliers' income, volume of energy sold is not a key driver of supplier profitability (see 'Background' above). The incentive schemes can help encourage consumer

retention, which is a key driver. The Supplier Obligation may increase the economical viability of these tariffs, particularly if they are offered as part of energy services packages.

Score: 3–4 (3 for current offers, 4 for future offers in context of Supplier Obligation)

Environmental sustainability

The tariffs are designed to encourage demand reduction, although this needs to be sustained. Current products are only likely to incentivise low cost energy efficiency measures. However, the Supplier Obligation may encourage suppliers to offer energy services packages in which more extensive energy efficiency measures are offered alongside reduced consumption tariffs. The 'energy efficiency credits' offered by SSE are more sustainable than the Nectar points offered by EDF Energy (which have minor economic value to consumers).

Score: 3–4 (3 for current offers, 4 for future offers)

Social justice

The tariffs are more suitable for consumers with high consumption who are willing to cut consumption. These tend to be more affluent consumers. The current tariffs of this nature are only available to online consumers. Many low-income consumers will therefore not be able to access them. If future tariffs of this nature are available to low-income consumers, there is a danger that some may ration essential use.

Score: 2

Level of intervention required

The Supplier Obligation is likely to encourage suppliers to offer more extensive versions of this tariff structure, particularly if suppliers face penalties for not reducing consumption levels.

Consumer implications

The combined impact of reduced prices and home improvements through energy service packages is likely to provide an attractive package for consumers able to take advantage of these tariffs.

Verdict

The current reduced consumption tariffs are forerunners of potentially far-reaching tariffs that could encourage more sustainable consumer behaviour, particularly if offered as part of energy services packages. However, they are only likely to appeal to higher income consumers, who have both the capacity to reduce consumption and the capital to invest in energy efficiency and other low carbon measures (unless finance is provided as part of energy services packages).

'Green' tariffs

Since 2000, suppliers have offered consumers 'green' electricity tariffs, which are intended to offer additional environmental benefit beyond standard tariff offers. Most suppliers charge a premium for green tariffs, ostensibly to reflect the costs of providing the additional benefits. However, NCC and energywatch argue that most green tariffs only match consumers against suppliers' existing renewable capacity, which suppliers are legally obliged to provide through the Renewables Obligation **[27]**. Thus, green tariffs do not increase renewable capacity but rather result in 'non-green' tariff consumers becoming 'browner'.

Take-up of 'green' tariffs by domestic consumers has been relatively slow to date. Research for NCC found that less than one per cent of energy consumers in Great Britain had signed up to a 'green' tariff **[28]**. NCC attributed the low rate to consumer confusion over what green tariffs actually offer. A lack of transparency makes it difficult for customers to understand the environmental benefits of a 'green' tariff and leads them to question their credibility. However, demand from non-domestic consumers is considerable, in part because business consumers accrue tax exemption and publicity benefits, and in part because environmental management systems require the purchase of renewable electricity.

Ofgem carried out an extensive consultation during 2007 and 2008 on proposals to update its 'green tariff' guidelines to energy suppliers **[29]**. Ofgem proposes that suppliers can only claim 'grid average' carbon emissions for green tariffs, reflecting the fact that they currently make minimal difference to renewable capacity. Ofgem also intends to establish a certification scheme operated by an independent third party to verify the additional environmental benefits claimed by suppliers. 'Additionality' will only be considered genuine if the green tariff funds activity beyond 'business as usual'. This will generally mean projects that would not be eligible for Renewables Obligation support.

energywatch and NCC advocate the mandatory provision of information on the renewable and carbon content of all individual tariffs and contracts to all consumers **[30] [31]**. They argue that suppliers allocate the bulk of renewable content to business consumers and minimal content to domestic consumers, despite the fact that all consumers currently contribute £10pa towards the Renewables Obligation **[32]**. Fuel mix disclosure for individual tariffs would provide greater transparency to consumers and encourage consumer pressure for reform.

The updated guidelines, reinforced by a credible certification scheme, may increase consumer confidence in suppliers' offers, which in turn may send market signals to increase renewable capacity. However, the considerable external constraints on renewable capacity will need addressing first. These include planning delays, grid issues and access to distribution networks.

Economic efficiency

The Renewables Obligation is the main driver of renewable capacity in Britain today, with green tariffs having minimal impact. They are therefore not effective at fulfilling their ostensible purpose. This may improve with the establishment of the certification scheme.

Score: 1 (because of their lack of impact on renewable capacity).

Environmental sustainability

Current green tariffs have minimal impact on renewable capacity and therefore environmental sustainability. They are also not designed to encourage investment in energy efficiency and other low carbon measures, or behavioural change. The revised Ofgem guidelines and introduction of a certification scheme may encourage additional investment in capacity (beyond that supported through the Renewables Obligation) and the development of more innovative products.

Score: 1–3 (current offers do not encourage demand reduction or increased renewable capacity; future offers may provide more genuine benefits).

Social justice

The premium attached to more meaningful offers means that green tariffs are only likely to be taken up by higher income groups.

Score: 1 (not relevant to most low-income consumers).

Level of intervention required

The certification scheme is already in the process of being established. However, its impact will depend on the criteria selected for accrediting offers, level of resources provided, scrutiny powers and extent of independence. The proposal to provide fuel mix disclosure for individual tariffs and contracts would require a minor licence change.

Consumer implications

The new certification scheme may increase consumer confidence in green tariff offers, although consumers will want reassurance that the scheme is truly independent. Provision of information on renewable and carbon content of electricity supply to all consumers may help increase consumer awareness of these issues, providing it is accompanied by wider consumer education.

Verdict

Green tariffs currently have minimal impact on renewable capacity and therefore environmental sustainability, despite consumers assuming this to be their main purpose. Green tariffs for domestic consumers are currently only a niche market, although their take-up may improve with the establishment of the certification scheme.

Feed-in tariffs

Feed-in tariffs oblige suppliers to buy renewable electricity, gas or heat **[33]** at a fixed price or tariff which is sufficient to make investment in renewable technology an attractive proposition. The tariffs are often differentiated to provide varying levels of support for different renewable technologies. The tariff is typically fixed for a specific period of time (for example 20 years), with a review process incorporated to determine the appropriate level of support. Feed-in tariffs are commonplace in many European countries and have proved very effective at increasing renewable capacity.

The EU, Carbon Trust and others argue that feed-in tariffs are a more cost-effective method of subsidising renewable electricity generation than the Renewables Obligation **[34]**. However, it is unlikely that feed-in tariffs will replace the Obligation in the near future, given the many major investment decisions based on the Renewables Obligation support structure. It is more likely that feed-in tariffs are introduced for microgeneration and small-scale renewables, allowing domestic consumers to benefit from renewable subsidies. The Renewables Obligation is not suitable for this scale of renewable generation, in part because of the administrative complexity of the certification process. However, it is not certain whether a small-scale feed-in tariff would represent a cost-effective means of reducing carbon emissions (although, neither is the Renewables Obligation **[35]**).

A small-scale electricity feed-in tariff would require the installation of smart meters to allow householders with microgeneration appliances to export surplus electricity to the grid. A heat 'feed-in tariff' for microgeneration would require a system of 'deeming' **[36]**, given the prohibitive cost of installing heat meters and the fact that there is no 'heat grid' as such to export heat to. In reality, the 'tariff' is better described as a production tariff. It is very unlikely that domestic consumers would receive direct benefits from the introduction of a gas feed-in tariff since renewable gas technologies do not exist at an individual household level.

Economic efficiency

It is difficult to set the tariff at the right level to ensure it sends the right price signals. Feed-in tariffs are also less likely to drive competition between suppliers because a minimum price is guaranteed. Electricity feed-in tariffs have little relationship to the marginal price of electricity at any given time and heat 'feed-in tariffs' only affect the consumers installing equipment, since 'surplus' heat is not exported (with the exception of community district heating schemes). Advocates argue that a feed-in tariff would compensate for past market failures to adequately reward low carbon energy generation. One stakeholder suggested a possible variation in which the tariff is set at the system marginal price of electricity plus X (i.e. the subsidy). More evidence is therefore needed on the cost-effectiveness of feed-in tariffs.

Score: 2

Environmental sustainability

Feed-in tariffs could transform the level of investment in small-scale renewables and microgeneration by householders and community schemes, although their cost-effectiveness at securing carbon reductions is uncertain. They may also encourage the development of energy service packages as a means of financing the initial capital investment required. Some argue that household use of micro-renewables encourages greater consumer awareness of energy in general **[37]**. However, feed-in tariffs are not designed to directly encourage energy efficiency investment or behavioural change, although consumers with renewable installations are also likely to reduce carbon through other means.

Score: 3 – 4

Social justice

Feed-in tariffs are likely to have a regressive impact unless accompanied by other policies to encourage take-up among low income households. This is because all consumers would pay for the tariff through a levy **[38]**, with only those able to make the initial capital investment benefiting. Low-income consumers would benefit more from a heat than an electricity feed-in tariff since they tend to be 'heat poor' **[39]**. Feed-in tariffs could benefit low-income consumers if renewable technologies are included in grant (for example, Warm Front), community renewable and social landlord schemes. For fuel-poor households living in hard to treat properties (those built with solid walls and/or are off the gas network), renewable technologies could have a dramatic impact on reducing fuel costs and hence fuel poverty.

Score: 2 – 3 (depending on whether parallel policies introduced to support low-income consumers).

Level of intervention required

Feed-in tariffs for small-scale renewables would require secondary legislation. The government's draft Renewable Energy Strategy proposes a small-scale feed-in tariff for electricity and a similar 'renewable heat incentive' for heat as potential measures for increasing renewable capacity in Britain **[40]**.

Consumer implications

If take-up is high, feed-in tariffs may increase consumer power considerably vis-a-vis the energy industry, since consumers will produce their own electricity and/or heat. They may also encourage smaller companies and energy service companies to enter the market, leading to a more competitive market place.

Verdict

Small-scale feed-in tariffs are not economically efficient, although they could play a major role in nurturing microgeneration and small-scale renewables, increasing consumer power in the energy market and contributing to Britain's renewable energy targets. They are not designed to encourage energy

efficiency investment or behavioural change, although this could be made a condition of receiving the tariff. Parallel policies would be needed to ensure low-income consumers benefit.

Rising block tariffs

Rising block tariffs, or increasing block tariffs, adopt a pricing structure in which the unit price of electricity or gas increases as consumption increases. The tariff increases occur at stepped intervals, with a low- (or zero) priced block(s) to cover basic/essential energy use, and subsequent blocks charged at higher unit prices. The approach 'rewards' low energy users with lower prices, provides incentives to reduce demand among higher energy users and ensures supplier revenue is recovered through the higher charges for high energy users.

The tariff structure is common in South East Europe, as well as the Flemish part of Belgium **[41]**. The government suggests suppliers may consider introducing rising block tariffs under the Supplier Obligation, particularly if the more radical 'cap and trade' option is introduced **[42]**. However, CSE's study for WWF suggested they are only likely to come about through the government mandating all suppliers to structure their tariffs in this way **[43]**. Without such a mandate, many high-use consumers may switch to suppliers that do not use the tariff structure.

NCC and WWF advocate rising block tariffs for water **[44]**. Folkestone and Dover Water Services is about to introduce a rising block tariff for some of its water consumers, suggesting that it can make commercial sense for water companies **[45]**. However, water companies do not face competition, unlike energy companies.

While smart metering is not a prerequisite for rising block tariffs, it would certainly help consumers monitor their consumption so that they can avoid moving into higher consumption blocks. Rising block tariffs should also take into account household size, since this will in part determine energy need. It would be very difficult for suppliers to obtain such information, although one option may be to assume a default household size. This would incentivise consumers to provide suppliers with information about actual household size.

The CSE study suggested that there are three broad options for constructing rising block tariffs, depending on the policy objective sought:

1. achievement of electricity and gas demand reductions (environmental);
2. balancing overall supplier revenues (economic); and
3. reducing the burden of energy costs to low-income households (social).

The CSE study suggests that if a rising block tariff structure was introduced, it should aim to address both environmental and social objectives and include a parallel investment programme to improve the properties of households at risk of fuel poverty **[46]**. This programme could be funded, at least in part, by the additional revenue suppliers would receive from 'more aggressive increasing block tariff structures'. It also suggests introducing special tariff arrangements for households reliant on electricity for space and water heating.

Economic efficiency

Rising block tariffs do not currently reflect suppliers' costs, although they may become more cost-reflective under the Supplier Obligation (particularly the 'cap and trade' option) as suppliers seek new options for compliance with their targets. The tariff could create revenue uncertainty for suppliers, thereby undermining full cost recovery. This is because consumer response would be unpredictable, both before introduction of the tariff (since suppliers would not know how consumers will respond) and after (since consumer adjustment may take some time to 'bed down'). Regulatory intervention could be restricted to determining the positions and widths of the blocks and the price ratios between them, while allowing suppliers to compete on prices within the individual blocks.

Score: 1 – 3 (the Supplier Obligation may encourage suppliers to offer rising block tariffs as a means of recovering costs and ensuring cost reflectivity).

Environmental sustainability

Rising block tariffs could play a major role in encouraging behavioural change and investment in energy efficiency by consumers, although the extent of change is unpredictable until the tariff is in place. The extent to which the tariff encourages demand reduction depends on the way in which it is structured.

Score: 4

Social justice

Rising block tariffs could help make energy more affordable for many low income households, given that they tend to have low consumption and would therefore benefit from a lower cost 'first block'. They also represent one of the few tariff structures that can explicitly address social justice objectives. Rising block tariffs represents a more 'universalist' approach to meeting social justice objectives in that they do not involve means testing, unlike social tariffs. Suppliers would have to recover any revenue lost from a lower cost first block from a smaller consumer base for the subsequent blocks. This may limit the extent to which the first block offers lower prices. The extent to which rising block tariffs are redistributive depends on the way in which they are structured. Even redistributive approaches are likely to require complementary measures (over and above existing provision), possibly through the benefit system **[47]**, for low-income consumers with high energy needs, for example due to disability or

poor quality housing. However, they do raise the potential for using any extra revenue generated to fund energy efficiency investment for low income households, although this may require mandating. **Score 3-4** (depending on whether additional support is provided through the benefit system and for energy efficiency investment).

Level of intervention required

Rising block tariffs would require a high level of intervention with respect to their structure; special arrangements for consumers reliant on electricity for heating; parallel energy efficiency investment programmes; and social security reforms to compensate high-consuming low income households **[48]**. Their introduction would go against the grain of liberalisation policy since it would reintroduce regulatory intervention in price structures. One stakeholder thought that rising block tariffs were only feasible under a transformed energy market, in which energy service companies were commonplace, smart meters universal and homes well insulated.

Consumer implications

Rising block tariffs are likely to prove popular for consumers with low consumption and less popular for consumers with high consumption. However, government policy is increasingly attempting to follow the 'polluter pays' principle. It could be argued that energy consumers with high consumption will have to accept this logic and ideally take steps to reduce their consumption. Consumer education would be required to ensure consumers can respond to the price signals sent by different blocks.

Verdict

Rising block tariffs may offer an attractive long term solution to structuring tariffs in a sustainable way, in that they address both social and environmental objectives. However, they are likely to require considerable intervention, both internal and external to energy markets. They also present considerable challenges to economic efficiency, given that they do not reflect suppliers' current costs, and would present uncertainty (at least in the short and medium term) about the extent to which they allow full cost recovery.

Time of use tariffs

Time-of-use tariffs offer different unit prices for varying blocks of time. The time-of-use periods will differ depending on the timing of peak system demands over the day, week or year, and may be year-round or seasonal. Other examples include 'critical peak pricing tariffs', which have high per-unit rates for usage during designated 'critical peak periods', and 'real-time pricing tariffs', which reflect the wholesale price of electricity and therefore vary continuously over time. Time-of-use tariffs are commonplace in the non-domestic market.

The *Economy* 7 tariff represents an existing, simple form of time-of-use tariff. The tariff is structured to offer low rate electricity during 'off-peak' periods (typically midnight to 7am), with higher rates during 'peak periods'. Almost all consumers reliant on electricity for their main source of heating use this tariff form. While almost all *Economy* 7 consumers are likely to optimise use of the tariff for heating through electric storage radiators, many do not optimise other uses, such as washing machines or hot water.

Another existing time-of-use tariff, used by about ten per cent (230,000) of domestic electricity consumers in Scotland, is dynamic teleswitching **[49]**. Consumers on this tariff use a particular type of electricity meter that allows the supplier (or distribution company) to switch supply remotely. Suppliers can instruct distributors to switch tariff rates remotely, to encourage consumers to reduce demand during peak periods. Since the tariff requires a special form of meter, consumers cannot switch to suppliers who do not offer this tariff. This effectively means they are locked into the two main Scottish suppliers, unless they pay for a new meter.

Smarter metering systems open up possibilities for many new time-of-use tariffs. The theory is that the associated real-time demand-feedback possibilities offered through smart meters would help households adapt their demand to the new price signals created by the tariffs. Smart meters would also enable energy suppliers to monitor the impact of the new tariffs on the level and distribution of demand for gas and electricity.

Owen and Ward argue that time-discretionary use of electricity mainly applies to wet appliances (including tumble driers), electric showers and a modest amount of lighting **[50]**. Estimates suggest that these uses account for about 20 to 25 per cent of all household electrical appliance use. Around 70 to 80 per cent of household electricity use (fridges, freezers, lighting and brown goods) is likely to be non-discretionary and therefore non-price responsive. Virtually all electric space heating is already off-peak and therefore does not offer additional potential for load reduction.

Time-of-use gas tariffs are likely to be seasonal, rather than 'within-day'. Owen & Ward argue such tariffs would need to be extremely high in winter to influence consumer behaviour, which could prove controversial **[51]**. Similarly, lower summer tariffs may perversely encourage higher gas use. Seasonal gas tariffs could, however, produce a beneficial effect for shippers and suppliers in Spring and Autumn, when gas demand is at its most unpredictable due to temperature variations.

A trial of time-of-use tariffs, in conjunction with keypad meters, in Northern Ireland found that consumers reduced consumption by ten per cent at evening peak, resulting in 1.5 per cent cash saving **[52]**. However, the trial found that consumers slightly increased overall consumption. The research

concluded that time-of-use tariffs have some impact on reducing peak demand, leading to lower bills, but little impact on overall energy consumption.

The development of 'dynamic demand' technology opens up the prospect of new tariffs in which consumers allow suppliers to remotely switch off electricity during peak periods, thereby reducing the need for 'spinning reserve' (generating capacity that can be called on at short notice). It could also improve the viability of some renewable generation, such as wind and solar, which present new challenges to grid-balancing. Dynamic demand control entails remote control of time-flexible appliances, such as refrigerators, air conditioners, water heaters and pumps, which are turned off when there are power imbalances on the grid. Dynamic demand appliances, acting together, can reduce demand more rapidly than a traditional 'spinning reserve' generator can increase its supply **[53]**.

Economic efficiency

Time-of-use tariffs are more cost-reflective of variations in wholesale prices than other tariff structures, with dynamic demand control potentially improving cost reflectivity even further. They create consumer incentives to reduce peak electricity demand and the amount of inefficient spinning reserve required. However, one stakeholder warned that the complexity and cost of introducing time-of-use tariff systems may be considerable and could outweigh the benefits.

Score: 4

Environmental sustainability

Time-of-use tariffs can help reduce peak consumption but not overall consumption (unless aggressive seasonal tariffs are introduced for gas). However, they can still reduce carbon emissions because peak generation tends to have higher carbon content. Less generating capacity is kept on standby during 'off-peak' periods, which is inefficient. The amount of load that can be shifted to off-peak periods is fairly modest in Britain, unlike countries in which air conditioning is widely used. Dynamic demand control is not designed to influence consumer behaviour (in that demand reduction takes place automatically), although it may encourage consumers to invest in more efficient appliances.

Score: 3

Social justice

Economy 7 tariffs make electricity more affordable for low income households, although it still represents a more expensive method of providing heat compared to gas (with the exception of heat pumps). The impact of time-of-use tariffs on low-income consumers is unknown, with commentators predicting both negative and positive impacts. This highlights the importance of researching the potential distributional impact of time-of-use tariffs **[54]**. Aggressive seasonal gas tariffs could lead to many low income households rationing essential use. **Score: 2**

Level of intervention required

Suppliers consider they can introduce time-of-use tariffs without government or regulatory intervention. However, consumer organisations consider that protection measures will be required to help ensure consumers can easily compare tariff offers and to limit the degree of variability in tariff structures.

Consumer implications

A recent study reported that most consumers stated they would continue to use energy whenever they needed it, regardless of price signals from time-of-use tariffs (although the experience of *Economy* 7 suggests otherwise **[55]**). One stakeholder argued that consumer education and effective presentation of information are essential for ensuring optimal consumer response to time-of-use tariffs. There is a risk that the greater variety of tariffs offered will confuse consumers and make it difficult to establish which tariff best suits their needs. Many consumers are likely to resist suppliers being able to control their consumption through dynamic demand, although this may depend on the degree of price incentives offered.

Verdict

Time-of-use tariffs are likely to become more commonplace with smart metering, with dynamic demand control offering further possibilities. However, their main impact on electricity will relate to peak consumption, rather than overall consumption. Seasonal gas tariffs could reduce overall gas consumption, but this would require particularly high tariffs, which would prove contentious, and militate against their likely introduction. The impact of time-of-use tariffs on peak consumption may prove fairly modest, given the relatively modest level of time-discretionary electricity consumption in Britain.

Summary of tariff evaluation

Table 4 below summarises the scores allocated to the different tariff structures.

Table 4: Summary of tariff evaluation

Tariff	Economic Efficiency	Environmental sustain-ability	Social justice	Level of intervention required	Consumer implications: all consumers
Standard[1]	3-4	2	1-2	N/A	N/A
Social tariffs					
Current	3	2	3	Stakeholder pressure	Minimal
Future	2	3	4	Significant	May depend on extent of cross subsidy
Reduced consumption					
Current	3	3	2	N/A	Minimal
Future	4	4	2	Cap & trade Supplier Obligation	Will require consumer education
Green tariffs					
Current	1	1	1	N/A	Minimal
Future	1	3	1	Minor	Minimal
Feed-in	2	3-4	2-3	Significant	Depends on whether all consumer groups benefit
Rising block	1-2	4	3-4	Extensive	Will require consumer education
Time of use	4	3	2	New consumer protection required	Will require consumer education

[1] Includes tariffs with a standing charge, tariffs without a standing charge and capped tariffs.

Table 4 shows that no tariff structure succeeds in scoring highly on all the sustainability criteria. The 'reduced consumption incentive' tariffs score well on economic efficiency and environmental sustainability, in the context of a Supplier Obligation that penalises suppliers that do not reduce consumption. However, it does not address social justice and is unlikely to have much relevance to low income groups who have little capacity to reduce consumption without rationing essential usage.

Rising block tariffs score well on environmental sustainability and social justice criteria, providing there are complementary policies to install energy efficiency measures in the homes of low-income consumers and support low-income consumers with high consumption. They will require considerable consumer education to make sure consumers can respond optimally to the tariff. However, they will require a high level of intervention both internal and external to the energy market, although suppliers may develop more limited products under the Supplier Obligation. They therefore only appear to represent a longer term option.

More extensive social tariffs score well on social justice criteria, but less well on environmental and economic criteria. They provide a partial solution to the problem of energy affordability, but still require complementary measures through social security, energy efficiency and measures for low-income consumers not eligible for social tariffs (as indeed other tariff structures do).

Small-scale feed-in tariffs score well on environmental sustainability criteria but less so on social justice criteria, unless compensatory policies are introduced to ensure low-income consumers can benefit. They are not very economically efficient (but neither is the Renewables Obligation).

Time-of-use tariffs score well on economic efficiency criteria and reasonably well on environmental sustainability criteria, although their main impact is the reduction of electrical peak consumption, rather than overall consumption. It is difficult to predict their impact on low-income consumers, although they are not explicitly intended to address social justice criteria. They will require considerable consumer education, both to ensure consumers make optimal use of the tariffs and to address the likely confusion that will arise from their relative complexity.

The evaluation therefore suggests that there is no 'silver bullet' for addressing sustainability through tariffs. No one tariff structure scores highly on all three pillars of sustainable development. A combination of approaches is therefore necessary to improve sustainability, both through tariff and non-tariff policies. Policies external to the energy market are also required. The final chapter discusses possible ways forward.

Towards sustainable energy tariffs

This report has shown that it is difficult to address the three pillars of sustainable development within any one type of tariff structure. There are also considerable constraints on achieving sustainability, both internal and external to the energy market. They include:

- Internalising environmental costs within tariffs increases energy prices and makes energy less affordable to low income households.
- Energy affordability is a difficult goal, given Britain's highly unequal income distribution[56].
- Britain's highly centralised energy networks and trading systems increase energy wastage and reduce competitiveness by preventing new entrants to the energy market.
- The failure of policy to address consumers' need for heat, particularly from renewable and low carbon sources.
- The lack of engagement of energy consumers with their energy consumption.
- The influence of Britain's legacy of thermally inefficient housing on energy affordability and wastage, and disproportionate sensitivity of low-income consumers to tariff innovations that increase costs.
- The tensions involved in deciding a balanced allocation of costs between energy consumers and taxpayers with respect to addressing environmental externalities.
- The tensions involved in deciding a balanced allocation of the social costs of unaffordable energy between energy consumers and taxpayers.

Addressing sustainability through tariff policy has to take into account wider transfers between energy consumers and taxpayers. The government is clear that it expects social and environmental costs to be dealt with through a combination of tariff policy, non-tariff energy market measures, social security and capital programmes. However, there are inevitable tensions in arriving at an equitable balance of cost allocation. In broad terms, sustainability programmes in which costs are borne by consumers are more regressive than programmes paid for by taxpayers. This is because taxation is designed to be broadly progressive whereas programmes paid for through consumer levies are generally regressive. This is because the proportion of income spent on energy by low income groups is much higher than that spent by higher income groups **[57]**.

Nevertheless, tariff policy can have a greater impact on sustainability. Some possible ways forward are discussed below under the heading, 'Towards sustainable energy tariffs'. The following section discusses the possible impact of existing policies on sustainability.

The influence of policy on sustainability

The appendix to this report highlights the increasing importance of the European Union on energy policy. While the liberalisation of energy markets in most European countries is behind Britain, it is rapidly gathering pace. However, the domination of large multi-national energy companies is as much a feature of European markets as it is British. This diminishes the potential for smaller, more locally sensitive companies under a range of ownership structures (for example, municipal, mutual and co-op, as well as private) to become a significant force within the energy market. Yet many would argue that local control, or at least local influence, is also an important element of sustainability.

European Union policy also has a major influence on sustainability policy, including renewable generation, energy efficiency, consumer protection, smart metering and, to an extent, affordability **[58]**. With respect to British policy (much of which is driven by EU directives), the policy review described in the appendix **[59]** suggests that while many policies impinge on energy sustainability, few have substantial implications for tariff structures.

The intervention that will almost certainly have an impact on tariffs is the likely introduction of smart metering coupled with real time displays (see Appendix B). Smart metering will make possible a wide range of tariff structures, particularly 'time of use'. It would also facilitate the introduction of feed-in tariffs and rising block tariffs, although both will require further government intervention. Another planned intervention that is likely to affect tariff structures is the post-2011 Supplier Obligation. This may encourage suppliers to offer reduced consumption incentive tariffs, possibly tied in with energy service packages and (less likely) rising block tariffs.

Both smart metering and the post-2011 Supplier Obligation will have major implications for sustainability outside the opening up of new tariffs. Smart meters plus an effective consumer interface in the home, for example, will encourage the improved engagement of consumers with their energy consumption, particularly if a parallel consumer education and advice programme is carried out. Smart metering should also reduce, if not eliminate, the prepayment meter surcharge and thus improve energy affordability, since the same meter is used regardless of payment method.

Similarly, the Supplier Obligation is intended to encourage supplier initiatives that will bring about behavioural change, such as lifestyle changes and increased energy awareness. As the 'low hanging fruit' of loft insulation and cavity wall insulation start drying up, it should also encourage investment in more extensive energy efficiency and low carbon measures, for example solid wall insulation and microgeneration. The government may split the obligation in two, with one part focused on carbon reduction and the other on affordable warmth **[60]**. This may increase the effectiveness of the programme in meeting both carbon reduction and affordable warmth targets.

Towards sustainable energy tariffs

In considering the future design of more sustainable energy tariffs it is first worth setting out the desired policy outcomes. These might include:

- fuel is affordable for low-income consumers;
- energy 'profligacy' is penalised;
- consumers are encouraged to reduce their consumption, providing they do not ration essential usage;
- investment in energy efficiency and low carbon measures is encouraged and made easy for consumers;
- consumers are engaged with their energy consumption and feel in control;
- providers of energy services are accountable to their consumers;
- consumers are able to make an informed choice about energy service options (to the extent that 'choice' is meaningful); and
- costs are fairly allocated between energy consumers and taxpayers.

We identify three possible options for meeting these outcomes, plus a fourth option that cuts across the three options.

1. Further development of existing policy

Suppliers are encouraged to offer attractive 'reduced consumption incentive' tariffs for more affluent consumers and an extensive package of social tariffs for lower income consumers. Reduced consumption incentive tariffs should offer meaningful incentives for investment in low carbon measures, possibly through tying in easy finance packages. Social tariffs should similarly ensure low carbon measures are installed in the homes of social tariff consumers, except that they are provided free of charge, as with the priority group element of the Energy Efficiency Commitment programme. The government should take responsibility for ensuring social tariffs are targeted at low-income consumers.

Implications for policy

This option would require the following interventions:

- the introduction of a Supplier Obligation which includes an element designed to incentivise suppliers to reduce the consumption levels of their consumers; and
- the introduction of minimum standards for social tariffs, with government taking responsibility for ensuring suppliers target social tariffs at low-income consumers.

2. Rising block tariffs

Under this option, suppliers are required to structure their tariffs so that the first block of consumption is offered at a relatively low rate, with subsequent blocks offered at increasing rates. This is to recover lost revenue from the lower rate first block, and provide funds for energy efficiency and other low carbon measures. These funds should be targeted at low-income consumers, with particular priority given to those living in hard–to-treat properties and those requiring higher levels of consumption due to ill health, disability and/or age.

Dispensation would be required for low-income consumers with high levels of consumption (even after investment in low carbon measures), either through the benefit system or in the form of a special tariff that exempts beneficiaries from the rising block structure.

The tariff structure would need extensive modelling and testing before introduction, to determine the appropriate positions and widths of blocks and the price ratios between them. It would also require a regular review process to take into account social trends and changing consumption levels among consumers. The option would require a certain amount of 'reregulation' of tariffs, although suppliers would still be able to compete on price within the blocks.

Implications for policy

This option would require the following interventions:

- Regulation of tariff structures such that all suppliers are required to structure their charges according to defined blocks of consumption and the price ratios between them. It would also require a regular review process to update the blocks and price ratios as appropriate.
- The introduction of parallel protection measures for low-income consumers with high levels of consumption, either through social security or exemption from the block structure. The government would take responsibility for defining eligibility for social security protection or for deciding exemptions.
- Redesign of the Carbon Emissions Reduction Target/Supplier Obligation scheme so that it integrates the increased revenue from higher consumption blocks for carbon reduction measures.

3. Variable VAT rates

Under this option, the government introduces differential VAT rates for different levels of energy consumption (for example, five per cent up to a certain threshold, 17.5 per cent above this and possibly a higher rate(s) for higher levels of consumption). The government would set the thresholds which would simply be passed on by the suppliers. The policy would have a similar effect to rising block tariffs but would have less impact on competition, since it would not require reregulation of tariff structures.

The policy follows the 'polluter pays' principle and has precedents in other areas of environmental fiscal policy, for example, the forthcoming variable car taxation rates and the Greater London Authority's variable congestion charge rates **[61]**. Both are designed to penalise more polluting cars and reward less polluting cars. It is not clear whether EU policy would allow the government to vary VAT rates in this way.

Variable VAT rates would lead to less dramatic price changes than rising block tariffs in that it is only the VAT 'levy' that varies, rather than the full cost of different blocks of consumption. The additional revenue raised could help fund low carbon measures, although this implies hypothecation of tax revenue, which would go against Treasury policy. As with rising block tariffs, protection measures would be required for low-income consumers with high consumption.

Implications for policy

- The introduction of increasing VAT rates for increasing blocks of energy consumption, with the government taking responsibility for defining the thresholds and their subsequent review.
- The introduction of parallel protection measures for low-income consumers with high levels of consumption, either through social security or exemption from the higher VAT rates. The government would take responsibility for defining eligibility for social security protection, or the Treasury, in consultation with the DWP, for deciding exemptions.
- The expansion of existing support programmes for low carbon measures. This should, as a minimum, be equivalent to the increased revenue raised through the higher VAT rates.

4. Policies that cut across the three options

The introduction of a feed-in tariff for small-scale renewable electricity and heat generation would be compatible with all of the above three options. Receipt of the tariff should be made conditional on investment in energy efficiency measures (whether or not there is a client contribution to such investment).

The government and the financial and energy industries should encourage the development of finance packages that make it easy for 'able to pay' consumers to invest in more expensive insulation, heating and other low carbon measures. These could be integrated with energy bills (perhaps through energy service packages), or provided separately, for example through green mortgages, equity release or low interest loans. The provision of such finance would help optimise the impact of reduced consumption incentive tariffs, rising block tariffs or variable VAT rates.

The government should provide increased funding for capital investment in energy efficiency, heating and other low carbon measures in the homes of low-income consumers through Warm Front (and Devolved Administration equivalents), social housing programmes and community schemes. It should aim for all homes to be brought up to the same low carbon standard, regardless of funding source.

Appendix A: Interviewees

This report draws on a number of interviews with key stakeholders from the following organisations:

- energywatch
- Ofgem
- Sustainability First
- Independent energy industry consultant (formerly senior manager in a major energy company)
- Green Alliance
- The Department for Business, Enterprise and Regulatory Reform (BERR)

CSE tried to carry out several further interviews, including with a representative of Defra, but was not able to arrange these within the timescale of the research.

CSE and NCC would like to thank the interviewees for their time and thoughtful contributions to the research.

Appendix B: energy tariffs and sustainability

Historical context to the current energy market

Since the mid-1980s, the UK government has pursued a policy of first privatising and then liberalising Britain's energy industry **[62]**. Competition was gradually introduced, first for industrial consumers, and then to all retail consumers by the end of the 1990s. The process involved major restructuring of the energy industry. Substantial investment, particularly in IT, was carried out to 'unbundle' (separate) the transportation, transmission and distribution functions from the supply function. In the wholesale electricity market, the replacement of the Electricity Pool with the New Electricity Trading Arrangements in 2001, led to extensive merger activity between supply and generation companies.

Economic regulators in the gas and electricity industries were created to regulate the monopoly elements of the industry (transportation, transmission and distribution) and foster free markets on the supply (and later) generation side. The primary duties of the separate gas and electricity regulators were to promote competition where possible; act as a surrogate for competition where competition was not feasible; and ensure that companies could finance their functions. Their secondary duties included the protection of the interests of energy consumers **[63]**. The 2000 Utility Act brought together these duties by making it a primary duty of the new combined gas and electricity regulator, Ofgem, ' to protect consumer interest wherever appropriate by promoting effective competition' **[64]**. This enshrined the primacy of market arrangements for allocating energy services to consumers.

Since 2000, Ofgem has sought to withdraw regulatory intervention in energy markets through either withdrawing controls altogether, or by encouraging self-regulation and voluntary initiatives by suppliers. For example, in 2002, Ofgem withdrew all remaining price controls within the domestic supply market, and in 2006, halved the number of licence conditions on suppliers through the supply licence review **[65]**. Similarly, following considerable political pressure in 2006 to introduce a statutory ban on energy disconnections, Ofgem worked closely with the Energy Retail Association (the suppliers' trade association) to put in place a voluntary disconnection protocol for vulnerable households **[66] [67]**. Ofgem also encourages suppliers to provide social tariffs and other social initiatives through their Corporate Social Responsibility agendas, and argues strongly against the imposition of a government mandate **[68]**.

The British approach to liberalising its energy industry is widely heralded as a success story, and provides a model for reforms of electricity and other network industries around the world **[69]**. Privatisation and liberalisation are considered to have brought about the efficient allocation of costs (through cost-reflective pricing), market sensitive investment, strong strategic management and consumer-focussed

provision **[70]**. Certainly, consumers enjoyed a long period of declining gas and electricity prices during the 1990s and first few years of the 21st century. However, liberalisation does have its critics, particularly with respect to its impact on sustainability. The following section summarises some of the issues.

Liberalisation and sustainability

Table 1 below lists some of the criticisms of the impact of liberalisation on the three pillars of sustainability.

Table 1: Sustainability critiques of energy market liberalisation

Economic	• Domination of energy market by six vertically-integrated companies limits competition and consumer choice • Efficiencies would have occurred regardless of liberalisation, for example due to more efficient generating technology • Historical cross subsidies continue in energy market, for example, between urban and rural consumers • Concern that prepay and standard credit consumers are cross-subsidising online tariffs • Distribution and connection charging regime discriminates against distributed generation and smaller companies entering the market
Environmental	• Tariff structures do not incentivise consumers to reduce consumption • Business models are based on selling units of energy, not energy services • No requirement on suppliers to compare the costs of supplying more units of energy with the costs of saving energy • Wholesale electricity market overly penalises Combined Heat and Power and renewable generation (the latter due to its unpredictability) • Long recognised that centralised electricity grid and trading arrangements disadvantage renewables and cause considerable heat wastage: liberalisation has not addressed these issues • Little government or regulatory policy attention to heat (as opposed to gas), particularly from renewable sources
Social	• Differential between Direct Debit and other tariffs, particularly prepayment, means many low-income consumers pay more for their energy • Low-income consumers have less access to banking and off-line facilities, preventing access to cheapest tariffs • Many consumers, particularly those on low incomes, are not actively participating in the energy market • Many consumers who have switched have not switched to 'best deals' • Energy market interventions designed to address environmental externalities have regressive impact on low-income consumers • Energy Efficiency Commitment programme, while environmentally effective, is less effective at providing measures that benefit low-income consumers • Reliance on voluntary initiatives by suppliers has proved inadequate for protecting low-income consumers from recent fuel price rises

Ofgem and sustainability

Concerns over climate change; lack of support for energy efficiency and renewable generation; and social inequalities in the energy market are chief among the reasons cited for sustainable development to be made a primary duty of Ofgem. For many years, the government resisted such calls, for example during the debate preceding the passing of both the 2000 Utilities Act and the 2003 Sustainable Energy Act. Eventually, a cross party group of MPs and Lords, supported by environmental organisations, successfully lobbied for the Energy Act 2004 to include a requirement for Ofgem to contribute to 'the achievement of sustainable development' as a secondary duty **[71]**.

The impact of this duty on Ofgem's work is debatable. The Sustainable Development Commission, for example, does not consider the duty sufficient **[72]**. It argues Ofgem has not kept pace with the climate change imperative, nor (although it is less emphatic on this) with the fuel poverty agenda. The Commission poses the question, 'should Ofgem be making a low-cost system as sustainable as possible, or should it be making a sustainable energy system at the lowest possible cost?' It calls for the 'reduction of greenhouse gases' to be made a primary duty of Ofgem, alongside the 'protection of the interests of consumers'.

Others call for more fundamental reform. Helm, for example, calls for a major overhaul of energy institutions in Britain (Ofgem, the Carbon Trust, the Energy Saving Trust and elements of government departments) and the creation of a new Energy Agency **[73]**. This would be charged with providing sufficient incentives on industry to provide much needed long term investment to improve security of supply, and for meeting the challenge of climate change.

The dramatic rise in fuel prices since 2003 illustrates some of the tensions in meeting sustainability objectives. Price rises have undermined a central plank of the government's Fuel Poverty Strategy **[74]** (low fuel prices), as well as Ofgem's main contribution to the strategy (maintaining a downward pressure on prices). While rising prices should make energy efficiency investment more attractive to consumers (due to reduced payback periods), it also makes it politically more difficult to introduce environmental policies that increase fuel bills and hence fuel poverty. This is within the context of government reluctance to fund energy efficiency measures through general taxation (which is broadly progressive but requires increased public expenditure), and its preference for funding measures through energy consumers' bills (which is regressive but has no effect on public expenditure).

The government and Ofgem's main response to rising prices is to emphasise the role of suppliers' voluntary 'social initiatives', particularly social tariffs, in mitigating the impact of price rises on low-income consumers. Ofgem thinks that the current 'voluntary' approach encourages supplier innovation and competition, while mandatory social tariffs would distort competition. The government, in its 2008

Budget statement, threatens legislation if suppliers do not 'voluntarily' increase their expenditure on social tariffs from £50 million to £150 million a year **[75]**.

Social tariffs, provision through consumers' bills rather than through taxation, and tensions between social and environmental objectives are key issues for sustainability policy. The following section gives an overview of existing policies that attempt to address these issues.

Policies for encouraging sustainability in the energy market

The above overview of Britain's energy market commented on the emergence of sustainability as an important issue of concern. While policy has not directed itself towards tariff structures, the government has intervened in other ways to encourage sustainability. Table 2 below gives a brief overview of some of these interventions.

Table 2: Energy legislation and sustainability

Policy	Sustainability implications
2000 Utilities Act	• Requires Secretary of State to provide social and environmental guidance to Ofgem • Government takes responsibility for setting energy efficiency targets on suppliers, with Ofgem responsible for administering the scheme • Ofgem given primary duty 'to protect consumer interest wherever appropriate by promoting effective competition' • Ofgem given secondary duty of having regard for the interests of older and disabled people, people on low incomes and rural dwellers.
2003 Energy White Paper	Four goals of energy policy defined as: • to cut CO2 emissions by 60 per cent by 2050 • to maintain the reliability of energy supplies • to promote competitive markets in the UK and beyond • to ensure that every home is adequately and affordably heated.
2003 Sustainable Energy Act	Ofgem required to conduct environmental impact assessments of all major proposals.
2004 Energy Act	Sustainable development incorporated as secondary duty of Ofgem.
2007 Energy White Paper	• Encourage private sector investment in new nuclear generation • Encourage energy saving, for example, introduction of Carbon Reduction Commitment for large organisations outside the EU Emissions Trading Scheme and introduction of the Carbon Emissions Reduction Target programme • 'Expectation' that all domestic consumers will have smart meters within 10 years • Promote support for low carbon technologies, for example, Carbon Capture and Storage • Encourage expansion of distributed low carbon electricity and heat • Promote renewable electricity, for example, through introduction of banded Renewables Obligation • Consider introducing mandated standards for social tariffs, should suppliers be found to lack a proportionate programme of assistance for vulnerable consumers.
2007 Climate Change Bill	• Provide legally binding carbon targets for UK economy with the progressive reduction of CO2 emissions by at least 60 per cent by 2050 against a 1990 baseline • Establish independent Committee on Climate Change responsible for monitoring and evaluating targets and considering whether emissions from international aviation and shipping should be included • Set five-year carbon budgets and ensure three successive carbon budgets (representing 15 years) will always be in law.
2008 Energy Bill	• Create a regulatory framework to encourage private sector investment in Carbon Capture and Storage projects • Introduce banding within the Renewables Obligation system to encourage development of renewable technologies that are less 'market ready' • Ensure operators of new nuclear power stations accumulate funds to meet the full costs of decommissioning and waste management.

The following gives a more detailed account of some of the main policy instruments for encouraging sustainability.

Energy Efficiency Commitment and Carbon Emissions Reduction Target

The 2005 to 2008 Energy Efficiency Commitment obliged all energy suppliers with over 50,000 domestic customers to fund the delivery of domestic energy efficiency measures. Defra set the overall target for energy efficiency savings from the programme. Under this programme, at least half of each supplier's targets must have come from Priority Group consumers (those receiving certain income-related benefits and tax credits). These consumers do not generally contribute to the cost of measures, unlike 'able to pay' consumers, who benefit from the programme through discounted measures.

The Energy Efficiency Commitment mechanism is designed to incentivise suppliers to meet their targets at the lowest cost. Suppliers are encouraged to incorporate Energy Efficiency Commitment programmes within their general marketing practices and to drive down the cost of delivering measures. This has led to suppliers focusing on measures such as energy saving light bulbs, loft insulation and cavity wall insulation. Measures such as heating systems or solid wall insulation are less common, despite their value in reducing fuel poverty (highlighting the fact that the Energy Efficiency Commitment is primarily an environmental rather than social programme). The 2005 to 2008 Energy Efficiency Commitment programme cost the average consumer £9 per fuel per year, or roughly two per cent of the average gas or electricity bill **[76]**.

The replacement Carbon Emissions Reduction Target programme runs from 2008 to 2011, and will cost a notional £18 per fuel per year **[77]**. The programme differs from its predecessor by setting carbon reduction targets (rather than energy reduction targets); reducing the priority group proportion to 40 per cent; extending the priority group to include all people aged over 70; and including more innovative measures such as behavioural change and microgeneration **[78]**.

The programmes represent a highly cost-effective method of reducing carbon emissions **[79]** and therefore score well on NCC's environmental and economic criteria for assessing sustainability. However, they represent a regressive means of funding energy efficiency measures because the proportion of income spent on fuel by low income groups is much higher than that spent by higher income groups **[80]**. The priority group mechanism is meant to address this equity problem. However, many low income households have not received measures under the programmes, and many live in hard-to-treat properties and therefore cannot benefit from the type of measures offered. The programmes therefore do not score well on NCC's social criteria for assessing sustainability.

Supplier Obligation

The Supplier Obligation will replace the Carbon Emissions Reduction Target scheme in 2011. The government's recent call for evidence on the obligation sets out its vision, in which consumer demand creates 'a robust, self-sustaining market for low carbon measures and services' **[81]**. It presents two

options for achieving this: a further evolution of the current measures-based approach; or a more radical shift to an outcomes-based scheme that would set overall targets on suppliers to reduce carbon emissions. The more radical option, called 'cap and trade', is likely to result in suppliers deploying a range of activities to deliver household carbon savings, including:

- new tariff structures and price incentives that encourage low energy consumption;
- promoting take-up of energy efficient appliances, energy saving building fabric measures and distributed measures, some of which are subsidised;
- offering energy services, with the goal of suppliers making profits from selling energy efficiency and microgeneration products as well as units of energy;
- getting involved in new build (prior to taking on consumers);
- providing tailored audits and/or performance contracts; and
- changing their consumer base so that they 'lose' high-use consumers unwilling to change and/or gain low-use consumers, thus reducing average energy consumption.

With respect to this report, the possibility that suppliers might offer new, more sustainable tariff structures is of particular interest. The Defra report suggests that suppliers might offer increasing block tariffs, whereby households are 'rewarded' for low consumption. Suppliers would determine a basic quota of energy at a fixed low baseline rate, while charging increasing rates to reflect the cost of noncompliance with the Supplier Obligation. This would incentivise energy efficiency investment and discourage 'profligate' use **[82]**.

Smart meters and energy feedback mechanisms

Improving feedback to consumers on their consumption of energy is essential for ensuring consumers are engaged with their energy use and capable of driving a more sustainable energy market. The government recently consulted on proposals to improve feedback to consumers, including options for installing smart meters with separate visual displays (or other ways of providing real-time information) in the homes of all gas and electricity consumers over the next ten years. The proposals are designed to ensure that the government complies with the EU's Energy Services Directive (see Appendix B, 'Energy services directive'). The government will make an announcement on the way forward shortly **[83]**.

The benefits of smarter metering systems include:

- improved consumer engagement with their energy consumption due to easy access to real time information;
- automatic and accurate meter readings, bringing an end to estimated bills. Remote meter reading will bring about considerable cost savings to suppliers;

- reduced energy consumption due to the provision of feedback on energy use and making consumers more aware of 'wasteful' energy use;
- new tariff structures, for example tariffs that encourage consumers to switch their energy use away from 'peak demand' periods; and
- fairer charges for prepayment meter consumers: consumers will have the same type of meter regardless of payment method. Prepay costs will also come down due to remote switching between prepay and credit tariffs and the elimination of misdirected payments and card and key replacement costs.

In the context of this report, the potential of smart meters to make possible new tariff structures is particularly relevant. These include 'time of use' tariffs, feed-in tariffs and rising block tariffs (described above under the heading 'Evaluation of energy tariffs').

Renewables Obligation

The Renewables Obligation is the government's primary means to support the generation of renewable electricity in Britain. Introduced in 2002 and administered by Ofgem, the Obligation is a market-based mechanism that requires licenced electricity suppliers to source a specific and annually increasing percentage of electricity from eligible renewable sources. This percentage currently stands at 7.9 per cent (for 2007 to 2008) and is set to rise to 15.4 per cent by 2015 to 2016 **[84]**. Suppliers can meet their obligation by either presenting Renewables Obligation Certificates, paying a buy-out fund contribution, or through a combination of both.

The government's current Energy Bill proposes banding for different renewable technologies, and is designed to encourage renewable technologies that are less 'market ready', for example, off-shore wind **[85]**. The Obligation is funded through consumers' bills and is estimated to currently cost each electricity consumer, on average, £8 per annum, with the cost projected to rise to £28 per annum by 2016 **[86]**.

The Renewables Obligation system favours large scale projects and large vertically integrated companies who are able to balance different generation sources. The government admits that it does not work well for small-scale renewables and microgeneration due to the administrative complexity of the certificate system and the difficulties of reconciling small-scale renewables with Britain's balancing and settlement system (DTI, 2007a).

A number of studies have shown that the Renewables Obligation is a relatively costly method of subsidising renewables, compared with other support systems. This is because it leads to higher investment uncertainty, and requires projects to earn higher rates of return than would have occurred

under the feed-in tariff system deployed in many European countries. However, many consider it would be unwise to replace the system at this juncture, given that many large scale investments assume the Renewables Obligation support structure **[87]**.

Distributed energy

The government's stated policy towards distributed energy is to stimulate cost-effective, low carbon distributed energy, making it easier for smaller players to enter the market, and encouraging growth within the licenced framework, rather than outside it. The government and Ofgem have carried out a number of initiatives in recent years to encourage this:

- the joint DTI/Ofgem review of distributed generation **[88]**;
- the Office of Climate Change's 'Heat Project' and the recent call for evidence on renewable heat **[89]**;
- Ofgem's current review of the distribution and connection charging regime;
- the establishment of a working group to examine transmissions arrangements for distributed generation; and
- Ofgem's recent consultation on proposed reforms to licence conditions, designed to provide a more favourable environment for distributed energy **[90]**.

These initiatives represent a response to criticisms that the British regulation system was 'designed with the needs of large centralised generators in mind, and aspects of the system may therefore disadvantage smaller players' **[91]**. Greenpeace is more critical: 'liberalisation has fundamentally failed to get to grips with the role of the electricity network…new actors, such as householders, community, municipal and commercial energy service companies and regional and local government, could offer a challenge to the consolidated energy sector and its outdated business model' **[92]**.

European policies

The impact of EU policy on consumers (including energy consumers) in individual member states is considerable. For example, the European consumers' organisation, Bureau Européen des Unions de Consommateurs (BEUC), argues that 85 per cent of the legislation affecting consumers is decided at European level **[93]**. It is therefore worth reviewing European policy on energy, and its implications for sustainable energy in Britain.

Liberalisation and the common European energy market

The creation of an internal energy market is an important policy priority for the European Union, and is considered essential for meeting its three energy challenges of competitiveness, sustainability and security of supply. Until very recently, national gas and electricity markets operated as separate entities within the EU member states. These markets are slowly opening up, although the extent of progress

varies considerably between different member states. The liberalisation process began with large industries and businesses in 2003, and was intended to be extended to all domestic consumers by July 2007 **[94]**.

Liberalisation policy aims to ensure that suppliers across all grid and pipeline networks are subject to the same rules and regulations. It also aims to encourage cross-border competition by investing in electricity interconnectors to enable cross-border transport of energy. However, this is proving 'enormously problematic' **[95]**, with planning issues related to overhead power lines and the high cost of underground alternatives, significantly hindering progress.

The EU has identified a number of measures to meet its policy objectives **[96]**:

- 'unbundling' – where companies currently control both the energy network and supply/production, potentially resulting in bias and inequity;
- effective regulation – harmonising the powers of energy regulators and cross-border technical standards;
- establishing minimum requirements for transparency to ensure a standard level of information is provided by Transmission System Operators;
- pursuing the Priority Interconnection Plan with respect to investment in infrastructure;
- establishing common and binding minimum standards for network security; and
- developing an Energy Customers' Charter to tackle energy poverty.

BEUC argues that the liberalisation of the EU energy markets has not been very successful to date **[97]**. It contends that energy consumers in most member states are not able to switch suppliers and therefore benefit from cheaper prices. A limited number of suppliers dominate the market in most EU countries, with consumers' understanding of energy prices limited by ineffective billing practices. In the absence of effective competition, BEUC calls for increased powers for regulators. These should include:

- the ability to intervene in energy supply and limit the production capacity of the dominant companies;
- the ability to impose temporary tariffs and price caps; and
- powers to investigate and demand information, including the ability to search company premises.

European renewable targets

In 2007, the EU agreed to establish binding national targets on member states to source 20 per cent of energy across the EU by 2020 **[98]**. Draft proposals for targets for individual member states were issued in 2008 **[99]**. The UK's draft target is 15 per cent, a considerable challenge given that in 2005 renewables only accounted for 1.3 per cent of the UK's energy sources **[100]**.

The term 'energy' includes electricity, heat and transport. The main scope for increasing renewable capacity within the UK lies in the electricity industry, although BERR is currently investigating the potential for increasing renewable heat capacity **[101]**. The UK will therefore have to set a much higher target than 15 per cent for sourcing electricity generation from renewables, with estimates varying from 30 per cent to 40 per cent. Given that renewables only accounted for 4.7 per cent of electricity generation in 2006 to 2007, the draft EU targets imply a dramatic expansion of capacity for the UK **[102]**.

EU Emissions Trading Scheme

The European Union's Emissions Trading Scheme, launched in 2005, represents a central plank of the EU's strategy for tackling climate change. Under the Kyoto Protocol, the EU was set a target of reducing greenhouse gas emissions by eight per cent on 1990 levels by 2012 **[103]**. The EU has committed to achieve reductions by at least 20 per cent on 1990 levels by 2020. The Trading Scheme uses a 'cap and trade' system for trading carbon allowances, in which a market value is applied to carbon. The first phase of the Scheme required member states to develop a National Allocation Plan, which set an overall 'cap' on the emissions permitted by all participating players. The 'cap' is intended to create the scarcity that allows the carbon market to function properly.

The EU recently published proposals for developing the system beyond 2012 **[104]**. The proposals plan to increase the amount of emissions covered by the system; allow firms to purchase allowances in one EU country from other countries; introduce an emissions reduction target for industries not originally included in the scheme; and impose legally binding targets for renewables at the individual country level.

There are many critics of the Emissions Trading Scheme, or at least its initial phases. energywatch and NCC, for example, argue that the first phase of the scheme was too generous in the carbon allocations granted, resulting in a very low carbon price and insufficient incentives to reduce carbon **[105]**. Furthermore, while consumers paid for the scheme through increased fuel bills, generating companies made windfall profits due to the free allocation of allowances. In 2008, Ofgem argued that the British energy industry will earn a windfall of £9bn due to the free allowances allocated under the first two phases of the scheme. The Treasury should therefore implement a windfall tax on generating companies and use the proceeds to tackle fuel poverty **[106]**.

Energy Services Directive

The EU Directive on Energy End Use Efficiency and Energy Services requires member states to incorporate the Directive into national legislation by May 2008 **[107]**. The Directive aims to improve the efficiency of energy use in member states, and applies both to providers (subject to size thresholds) of energy services, and all end-users of energy (with the exception of those included in the EU Emissions Trading Scheme). The Directive sets an indicative energy savings target of nine per cent by 2017. The Directive requires member states to submit Energy Efficiency Action Plans on progress towards this target, and to place obligations on energy suppliers and distributors to promote energy efficiency, improve metering and billing and increase customer awareness and understanding of their energy use **[108]**.

The British government addressed the Directive's metering and customer billing requirements in the 2007 Energy White Paper **[109]**. BERR later consulted on more detailed proposals for metering and billing and is due to make an announcement on the way forward in the near future **[110]**. Smart meters and other government initiatives to meet the requirements of the Directive are discussed above in Appendix B, under the 'Renewables Obligation'.

Consumer protection in the EU

In 2007, the European Commission put forward a proposal for a European charter on the rights of energy consumers **[111]**. Consumers' entitlements under the draft Charter are expected to include:

- connection: the right to receive against payment regular and predictable levels of safe and secure electricity and gas services.
- supply: the right to change electricity and gas supplier free of charge.
- contracts: the minimum elements that every contract with an energy supplier must include.
- information: on energy supply, contract conditions, prices and tariffs, energy efficiency measures and the origin and generation method used for electricity.
- prices: energy must be made available at reasonable, clearly comparable and transparent prices.
- social measures: to provide vulnerable citizens with minimum levels of energy services (power, warmth and light) in order to avoid energy poverty.
- dispute settlement: the right to simple and inexpensive complaint procedures in the event of disputes.
- unfair commercial practices: as prohibited under the EU Unfair Commercial Practices Directive **[112]**.

A range of consumer organisations advocate strengthening the proposed Charter. BEUC, for example, advocates the introduction of a wide-ranging universal service obligation **[113]**. This would address such issues as protection against disconnection and fairness of tariffs, and enshrine the concept of affordability

within tariff structures (using an agreed definition of affordability that applies across the EU) **[114]**. energywatch advocates more detailed guidance on the definition of 'vulnerability', so that it is capable of reflecting the many and varied circumstances of consumers – circumstances that may change over time. energywatch also advocates making suppliers 'responsible for making available a tariff rate which makes the cost of energy affordable to those who are vulnerable or disadvantaged as a result of financial hardship' **[115]**: in other words, a social tariff.

Notes

1Thumim et al, 2007

2 Dore et al, 2007

3 Fuel poverty describes the combination of low household income, unaffordable energy costs, inadequate thermal insulation and inefficient heating systems.

4 Thumim et al, 2007

5 NCC, 2007

6 CSE, 2007a

7 Defra, 2007a

8 Mayor of London, 2004

9 CSE et al, 2005

10 Also, provision of a choice of payment methods; timely recalibration of prepayment meters; and establishment of Priority Service Registers (Ofgem, 2007a).

11 Fuel Poverty Advisory Group, 2008

12 HM Treasury, 2008

13 Fuel Poverty Advisory Group, 2008

14 NCC, 2002

15 Energy Retail Association, 2007; National Energy Action, 2007

16 However, energywatch argues that suppliers have passed on recent rises in wholesale prices to retail consumers more rigorously than they passed on the decline in wholesale prices that occurred during 2007 (Asher, 2008).

17 Wilson & Waddams Price, 2007

18 Baker, 2006

19 Ofgem, 2007b

20 HM Treasury, 2008

21 Parliamentary Warm Homes Group, 2008

22 energywatch, 2007a

23 Staywarm in particular encourages increased consumption and less consumer monitoring of their energy use. However, those with high consumption are taken off the tariff (unless they have a medical need) and beneficiaries are encouraged to install energy efficiency measures.

24 In brief, the 'contract and converge' principle entails contraction of emissions by profligate consumers and convergence towards equity of allocation among all individuals (Mayer, 2000). The principle forms the basis for combating climate change at an international level by working towards equity between developing and developed countries through the United Nations Framework Convention on Climate Change (UNFCCC).

25 Ofgem, 2007b

26 Baker, 2006

27 energywatch, 2007b

28 Graham, 2006

29 Ofgem, 2007c

30 Currently suppliers only have to declare fuel mix for their total supply, rather than individual consumer groups and tariffs.

31 energywatch & NCC, 2008

32 energywatch, 2008a

33 Strictly speaking 'feed-in tariffs' only apply to electricity supplied to the grid. This report uses the term to cover gas and heat as well in that the support mechanism is similar. The Renewable Energy Association uses the term 'renewable energy tariff' to describe a 'feed-in' type support structure that covers electricity, heat and gas (Renewable Energy Association, 2008).

34 EC, 2005; LEC Consulting, 2007

35 A Defra comparison of the main carbon reduction policies in Britain shows that the Renewables Obligation is one of the least cost-effective measures for reducing carbon (Defra, 2006).

36 'Deeming' describes the process whereby the heat output of an installation is estimated over time, with the reward based on this estimate, rather than actual output.

37 Hub Research Consultants, 2005

38 Advocates of feed-in tariffs argue that costs do not necessarily have to be borne by energy consumers. Alternative sources of revenue might include windfall taxes, use of proceeds from auctioning ETS allowances or general taxation.

39 Microgeneration sub-group of Fuel Poverty Advisory Group, 2008

40 BERR, 2008a

41 energywatch, 2006

42 Defra, 2007a

43 Thumim et al, 2007

44 NCC, 2002; WWF, 2007

45 PUAF, 2007

46 Thumim et al, 2007

47 It could be argued that all tariff structures require more extensive measures within the benefit system, particularly within the context of rising fuel prices and the costs of heating 'hard to treat' properties. However, rising block tariffs raise a unique issue in that they would cause undue hardship to particular categories of low-income consumers with high energy needs.

48 There are moves to mandate rising block tariffs at a European level. An amendment to the current draft directive for the internal electricity market advocates 'National Regulatory Authorities shall mandate electricity companies to introduce increasing block tariffs in order to stimulate reductions in household demand for electricity and related reduction in CO2 emissions and contribute to price redistribution.' (EC, 2008a)

49 Information provided by energywatch

50 Owen & Ward, 2007

51 Ibid

52 Northern Ireland Electric, 2005

53 BERR, 2007a

54 The Energy Demand Reduction trials may shed some light on this (Van Rensburg, 2008).

55 MORI, 2008

56 The UK has the most unequal income distribution among Western European states, as measured by the 'interquintile ratio' – the ratio between the bottom and top income 'quintiles' (Zartaloudis, 2007).

57 ONS, 2007

58 The European Commission is likely to adopt a definition of 'energy poverty' similar to that used in Britain, with the exception that the threshold will be set at twice national median energy expenditure, rather than the ten per cent used in Britain (EC, 2008a).

59 See Appendix B, 'European policy'

60 Defra, 2007a

61 HM Treasury, 2008; Transport for London, 2008

62 UK government, 1986; 1989; 1995

63 UK government, 1986 & 1989

64 UK government, 2000

65 Ofgem, 2002 & 2007a

66 This was in the context of a high profile case in which two pensioners died from hypothermia following disconnection from their energy supply.

67 Ofgem, 2007b

68 Ofgem, 2007b

69 Official Journal of the European Union, 2003; Kessides, 2004

70 Littlechild, 2003; Helm, 2004

71 Owen, 2006

72 Sustainable Development Commission, 2007

73 Helm, 2005

74 The government has a statutory obligation to eliminate fuel poverty in England, as far as reasonably practicable, among vulnerable households by 2010, and all households by 2016 (Defra & DTI, 2001). Similar targets exist for Scotland, Wales and Northern Ireland.

75 HM Treasury, 2008

76 Government Office for South West, 2006

77 National Energy Action, 2008

78 Defra, 2007b

79 A Defra comparison of the main carbon reduction policies in Britain shows that the Energy Efficiency Commitment is one of the most cost-effective policies for reducing carbon and results in a net benefit (Defra, 2006).

80 ONS, 2007

81 Defra, 2007a

82 See 'Rising block tariffs' above for further explanation.

83 BERR, 2007b

84 DTI, 2007a

85 DTI, 2007b

86 Ofgem, 2007d

87 EC, 2005; Toke, 2007; Edge, 2007

88 DTI/Ofgem, 2007

89 BERR, 2008b

90 Ofgem, 2007e

91 Ibid

92 Greenpeace, 2005

93 BEUC, 2007a

94 EC, 2005

95 Piebalgs, 2006

96 EC, 2007a

97 BEUC, 2007b

98 EC, 2007d

99 EC, 2008b

100 Directorate General for Energy & Transport, 2008

101 BERR, 2008b

102 BERR, 2007c

103 EC, 2007d

104 EC, 2008a

105 energywatch and NCC, 2007

106 Ofgem, 2008b

107 EC, 2006

108 EC, 2006

109 DTI, 2007b

110 BERR, 2007b

111 EC, 2007b

112 The 2005/29/EC UCP Directive of 11.05.2005 took effect on 12 December 2007.

113 BEUC, 2007b

114 energywatch, 2008b

115 energywatch, 2007c

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