Appendices for the short paper – '*Delivering carbon savings in the domestic sector'*

Appendix A – Consumer engagement

Figure 1: Evaluation of options to strengthen the role of energy performance certificates

Options	Strengths	Weaknesses
Requirement to display EPC data, and calculated energy costs, on advertising for sales / lettings	- Enables consumers to understand running costs of properties - May encourage seller / landlord to make improvements - For sale, potential to improve the EPC rating may be a selling point	- Estimated energy costs may not match real usage patterns - Properties with a poor EPC rating may not sell or be let - EPCs not yet robust; early promotion could undermine confidence
Display energy certificates (DEC) to all large public buildings and commercial premises	- Enables public scrutiny of the energy use of buildings - May encourage occupants to change their usage patterns	- No central database of public estate and other buildings to be covered - Costs of undertaking DECs
Financial support for measures and/or improvements in EPC rating	- May encourage consumers to undertake measures - Helps in covering upfront costs of measures	- Subsidies are likely to come from consumers - via tax / energy bills - Difficult to ensure equity in the way that subsidies are raised and applied
Stamp duty incentive linked to EPC rating (& penalty for F&G rated)	- Raise buyer's interest energy performance and offers rebate for improvements - May encourage seller to improve property, to sell their home quickly / for a higher price - Potential to be revenue neutral - Highlights cost to society of poorly rated properties	- Could hit distress sales - Only reaches those buying / selling a property - May not be fair – high penalty for properties which are hard to treat; regional variation

Options	Strengths	Weaknesses
Council tax incentive linked to improved EPC rating / installing measures	- Can encourage uptake of measures - Incentive available to all not just those moving home - Could be one off or ongoing incentive	- May require modest subsidy - If revenue neutral, would penalise those with properties which are hard to treat, and would effect everyone, not just those moving home - Tenants would be reliant on landlord action - May require additional EPC assessment
Capital gains tax incentive linked to the shortfall in meeting a property's potential EPC rating	- Encourages landlords to invest in improving the energy performance of properties - Property investors either ensure properties meet their potential or contribute to societal costs of cutting carbon	- Only effective at property sale
Reduction on VAT for energy saving refurbishment	- May encourage refurbishment of existing buildings and uptake of carbon saving measures - May give energy efficient products an advantage over less efficient ones	- Subsidy – would require increase in tax revenue - Difficulty in deciding whether refurbishment / measures are eligible for VAT reduction
Requirement for consequential improvements when renovating properties	- Encourages improvements to be made at a time when work already being undertaken, so as to minimise costs and disruption	- Additional costs of undertaking required measures
Sharing EPC data with local authorities to enable proper enforcement of he Housing Health and Safety Rating scheme[1]	- Helps reduce the costs to local authorities of identifying properties which do not meet minimum standards	- Local authorities have a poor track record of enforcement of HHSR - Need to be careful about data sharing
Social housing to reach higher minimum standard	- Registered social landlords can improve properties in bulk - Early adoption helps stimulate market - Leading by example	- Hard to set target without incurring higher costs unless RSLs can trade targets - Measures might become stigmatised (e.g. pre-pay meters) - Requires government

[1] This applies a minimum standard to social housing and private landlords.

Options	Strengths	Weaknesses
		expenditure
Non-domestic sector to reach minimum standard	- Encourages improvements in non-domestic buildings - Businesses may have access to capital - Private sector leadership / innovation	- It may be very costly / not possible for some properties to reach the standard
Minimum EPC rating to be reached or implement all cost effective measures in order to let or sell properties	- Encourages improvements in domestic properties - Reduces risk to health of people living in poor performing buildings	- May result in properties which cannot be sold or rented - Politically difficult if distress sale - Costs to reach the standard would vary by housing type - Could be unpopular with consumers

Figure 2: Examples of different trigger points

Trigger points	Examples
Social/community activity	- Community activities - Competitions for reducing carbon emissions - Neighbour gets a new product - Recommendations from friends / family - Children pester parents
Communications	- General communications about climate change - Marketing / campaigns - Awareness raising by different organisations - Endorsements by celebrities / popular magazines - News reports on climate change impacts
Moving home	- Preparing a property for sale / rental - Renovating a newly purchased property
Home improvement	- General home improvement, redecoration, repairs etc. - Undertaking renovations (e.g. new extension)
Product purchase	- Buying new products (e.g. certification and choice editing by retailers) - Distressed purchase when system breaks down (e.g. boiler) - Marketing of benefits of different products - Special offers on products
Lifestyle change	- Retirement - Unemployment - Having children
Financial pressure	- High energy bill / price rises - Realise wasting money and what this could be better spent on - Change in financial situation
Financial incentives	- Incentive / grant for specific measures - Fiscal incentives (e.g. council tax rebate) - Financial reward for reducing energy use
Other external factors	- Seasonal effects – such as keeping warm in winter

Figure 3: Example customer journeys

	Community activity	New home & refurbishment	Redecorating	Product	Ill health
Feels motivated	Wants to do what their neighbours are doing	Wants to add value to the property at low cost	Wants to improve the home	Broken new boiler	Wants a warm home
Seeks advice	Speaks to active community champion who suggests some simple behavioural measures and to see a local exemplar home for physical measures	Energy Performance Certificate (EPC) provides a number to call for more tailored advice. Architects and builders also offer advice.	Visits DIY store and notices special offer on insulation and draught-proofing measures	Energy supplier advises that although the boiler can be fixed it is 15 years old, and therefore it would be best to replace it with a new efficiency boiler with a smart meter and controls	Care worker visits home, notices the cold temperature and dampness and recommends a trusted energy advisor to visit the home
Weighs up options	Gets information and advise on measures to take, installers and funding available from neighbours and local online forum	Three packages (measures + finance) are recommended by an advisor from an independent body to improve the energy performance of the home to different levels	The advertisement suggests that the best time to get these measures is when undertaking other work and gives clear estimates on energy savings and payback periods	Energy supplier demonstrates the difference in running costs between the two boilers, and offers an option to buy now but pay later and in instalments for the new boiler	An advisor from an independent body assesses the home, suggests measures to undertake and notes that financial support is available to cover the costs – advisor also helps the consumer fill in forms
Gets work done	Installer puts in insulation measures and energy monitor, consumer undertakes behavioural changes	The consumer chooses a package and preferred delivery body from a list, the coordination body then makes arrangements	Buys and installs DIY measures	Energy supplier arranges installation of new boiler and smart meter / control and arranges repayment plan	Advisor arranges installation of measures via a pool of accredited installers (each given % of local leads)

Figure 4: Examples of barriers to address along the customer journey

Barriers	Examples
Not interested / motivated enough	- Not convinced by environmental arguments - Not interested in the measures / services on offer - Benefits are not clear / not compelling enough - Too difficult / too much effort
Lack of time	- Takes up time / too busy - Need to be in the home during the day for audits / measures / services - Distressed purchase (e.g. need to replace broken boiler as quickly as possible)
Costs too much / no access to capital	- Too expensive - Unwilling / unable to cover upfront costs - Difficulty in securing loans / reluctance to take on debt - Competing demands for limited funds (e.g. holidays) - Long / uncertain payback period for some measures
Limited social pressure	- Only ‘do-gooders’ taking action - No point in taking action unless everyone else does too - Few examples to follow / activities not yet social norms - Lack of leadership from government, businesses or other groups
Lack of coherent messaging	- Communications are not coordinated / consistent - No one is setting the context for why consumers should act - Messages from government are sometimes preachy (e.g. complaints over current Act-on-CO_2 advert) - Campaigns may be short-lived - First contact point might not be ‘on-message’ e.g. builder
May not increase property / rental value	- Not clear what effect measures will have on house prices / energy performance not valued - Uncertainty over length of occupancy in property - Split incentives for landlord and tenant in rental properties
Lack of knowledge / difficult to access relevant information and advice	- Not sure what to do to improve home - Not clear where to go for information and advice - Too little or in some cases too much information - Advice is generic rather than tailored to the individual - Advisors may not be trusted
Issues with choosing products / delivery agents	- Not knowing which measures, services or behavioural changes to undertake / what impact these would have - Impartial advisors not able to recommend particular products / delivery agents – therefore difficult to assess which are good/bad - Lack of trust in products / delivery agents - Admin involved in applying for offers / subsidies etc.
General hassle factor	- Disruption / intrusion / upheaval – especially if have to vacate property temporarily - Need planning permission for certain measures

Appendix B – Delivery

Figure 5: Principles for a new delivery framework

Principle	Description
Focus on delivering substantial carbon savings	- Meeting target of reducing emissions by 29% by 2020 - Interim carbon targets linked to the UK carbon budgets - Setting out a trajectory to 2050 - Enabling some flexibility to increase ambition levels if underperforming in other sectors
Deliver these savings cost effectively in the long-term	- Focus on cost effective delivery to ensure costs to consumers are minimised - However, we are not advocating continued delivery of cheap and easy measures, rather with heightened ambition over longer timescales, we envisage bundling of offerings into whole house packages to reduce transaction costs (e.g. audit + smart meter + measures + finance)
Work to ensure that customer experiences are positive	- This includes coordinated communications, developing a known brand, delivering better information and advice, making clear offers, engendering trust in products and delivery agents and resolving specific barriers to uptake
Allow flexibility to adapt offerings and approaches as appropriate	- Including a variety of measures, and enabling new innovative products to come on stream quickly - Flexibility of delivery approaches, which includes neighbourhood and whole house approaches, but also the use of key intervention points (e.g. moving home, renovation, lifestyle change) and the provision of individual measures as appropriate
Enable a competitive market for energy services	- Enabling a competitive market for energy services to develop, for example shifting away from a heavily subsidised model over time, to open the market up to new players
Provide an effective mechanism for ensuring targets are met	- Obligating parties to deliver - Focusing on driving consumer demand including through communications, incentives and possibly minimum standards
Ensure fairness in the way funds are raised and applied	- Reducing subsidies for those that are able-to-pay - Ensuring support is available for vulnerable consumers

Figure 6: Possible roles of different players

[Key activities are highlighted in ***ital bold***]

Players	Possible roles
Central Government / Public Sector	- ***Overarching targets & reporting*** - ***Framework for delivery*** - ***Framework for providing financial/fiscal incentives*** - ***Leading by example*** - Communications and engagement strategy
Local authorities	- ***Source of local knowledge*** - ***Identifying local needs and opportunities*** - ***Spatial planning*** - ***Coordination of different stakeholders / partnership working*** - Delivering savings in public sector buildings - Providing fiscal incentives to consumers - Local communications and advice
Coordination body	- Brand management - National communications - ***Advice and information centre – including frameworks for enabling peer-to-peer information and advice sharing*** - ***Quality assurance – including accreditation, certification, training and monitoring*** - ***Communications function for smart meters*** - Data management
Energy companies / energy service companies	- National and local marketing - Energy audits and advice - ***Delivery of measures and services and behavioural advice*** - ***Better energy use information*** - ***Customer services*** - Provision of consumer finance/incentives - Billing and debt recovery
Voluntary sector	- Campaigns and supporting communications - Coordinating local partnerships / local decision making - ***Community activities*** - ***Innovative enterprises (e.g. car share schemes)*** - Energy audits and advice - Other ancillary services (e.g. fire safety, home security, benefits checks)
Private sector / financial institutions	- ***Capital costs*** - Consumer finance packages - Debt recovery - Leadership & demonstration

Consumers	- ***Providing finance (e.g. capital, subsidy, loan repayments)*** - ***Undertaking measures & services*** - ***Behaviour change*** - Sharing experiences

Figure 7: Evaluation of possible delivery models

Models	Strengths	Weaknesses
Central / regional government led (e.g. government run programme to deliver target)	- Opportunity for an area based and more coordinated approach to delivery - Flexibility to change scheme to meet government priorities	- Public expenditure issues - Consumer trust issues - Could result in reduced consumer choice in terms of delivery agents - Susceptible to political interference
Local authority led (e.g. additional funding and targets)	- Local knowledge and accountability - Trusted body - Experience of area based delivery and opportunities to take a more coordinated rollout approach - Long term association with properties - Motivated to improve local communities - Links to other LA services	- Public expenditure issues - Variable performance of different local authorities (i.e. postcode lottery) - Difficult to penalise local authorities without impeding their ability to perform - Possible duplication of effort & bureaucracy
Central / regional body led (e.g. tender for performance contract)	- Possible for motives of agency and programme to be well aligned - Delivers multiple objectives on an area basis - Could act as an umbrella brand for accredited delivery agents - Might enable new players to enter the market and existing ones to leave	- Issues with how to raise funds - Risk of not finding suitable bodies to tender for contract - Risk of disruption if body underperforms
Energy company led (e.g. obligation)	- Encourages energy service business models - Product innovation and developing effective supply chains - Existing customer relationships - Delivery experience - Sales and marketing experience - Motive to minimise costs - Funds raised 'off-balance sheet' and access to finance at scale - Large penalty can be used to ensure compliance	- Tendency to go for quickest, easiest & cheapest delivery options - Consumer trust issues - Company motives are not necessarily aligned with programme objectives - Difficult for other players to access the market due the subsidies which obligated parties can offer

Open energy services market (e.g. incentives and/or regulatory steps in relation to consumers)	- High degree of consumer choice - Opens the market to new players - Flexibility to innovate - Incentives and/or regulation could help drive demand	- Relies on consumer interest - No certainty of outcome unless consumers are subject to regulation - Delivery unlikely to be coordinated - Only certain measures would be attractive to investment

Figure 8: Evaluation of existing energy company and local authority delivery partnerships

	Local authorities	Energy companies
Drivers for entering partnerships	- National Indicators 185 / 186 - Decent Homes - Local regeneration projects - Synergies with provision of other services (e.g. fire, security)	- Carbon Emission Reduction Commitment and Community Energy Saving Programme obligations - Developing energy service business model - Corporate social responsibility
Contribution to partnerships	- Understanding of local needs and opportunities - Local knowledge and links - Identifying and reaching particular groups (e.g. vulnerable) - Coordinating local partners - Access to social housing / private rental sectors - Engendering trust and thereby improving take up - Providing additional services to consumers (e.g. temporary accommodation)	- Marketing and delivery experience - Providing subsidies for measures and potentially financial support for the overall project - Developing innovative products and approaches
Issues	- Expectation that CERT / CESP money is like grant money and can be used for different purposes - Local procurement frameworks - Activity back-ended	- Only work with certain local authorities so not necessarily an even geographic spread - Only able to subsidise certain measures (e.g. not many solutions for hard-to-treat homes)
Success factors	- Clear and aligned objectives - Understanding of each others drivers and constraints - Combining local knowledge with technical expertise - Targeting specific segment groups with tailored messaging - Data sharing, surveying and modelling - Strong project management - Local identity for the scheme - Joint branding to overcome any potential trust issues	

Appendix C – Financing

Figure 9: Options for applying subsidies

Options	Strengths	Weaknesses
Fiscal incentives	- Can help stimulate consumer interest in energy performance - Disproportionate desire to reduce tax levels - Can be cost neutral – i.e. penalise worst performers and reward best	- Voter resistance to higher taxes - Inefficient, as subsidy only loosely related to carbon saving - Works best when housing market active [but hopefully will be in future] - Can be equity issues, as not necessary based on ability to pay
Subsidised measures	- Encourages take up of particular measures - Level can be adjusted for specific technologies, consumer groups, areas and over time – which makes them efficient - Simple for consumers to access as they are rolled into the price	- Subsidies for particular measures can distort market forces - Costs are passed through to consumers and there may be equity issues if only a few very expensive measures are heavily subsidised - May be less efficient than government spend
Financial incentives / grants	- Encourage consumer take up of measures - Financial support is tangible to the consumer - May be possible to band support levels by technologies or consumer groups	- Difficult to ensure the incentive / grant is set at the right level - May be available for a limited time period or until funding runs out - The application process can be off putting and admin costs may be high
Low interest loans (e.g. interest buy down, Pay-As-You-Save)	- Provides upfront capital for consumers - Flexibility as to which measures are undertaken - Encourages individual beneficiaries to pay a higher proportion of the costs for measures	- Consumers may not want to take on new debt - Need to protect the value of the asset over time - Need to reduce default risk to minimise subsidy levels - Complexities if want to pass on debt to future home owners

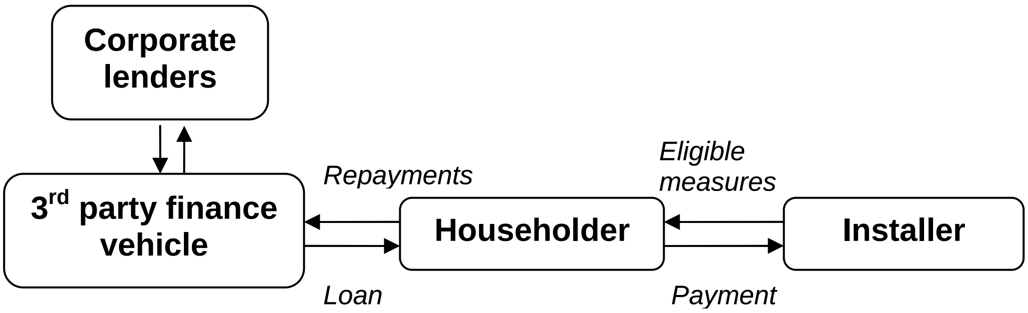
Cash handout (e.g. winter fuel payment)	- Can provide support to particular consumer groups (e.g. vulnerable)	- Short term rather than enduring solution - May be available for a limited time period or until funding runs out - Inefficient, as subsidy may be unrelated to carbon saving
Payment holiday (e.g. on loan repayments)	- Can provide support for particular groups when in difficult financial circumstances	- Short term rather than enduring solution - Inefficient, as subsidy may be unrelated to carbon saving
Rewards for reduced energy use (e.g. special tariff)	- Rewards consumers for taking action - Could help encourage behaviour change and take up of measures - Makes consumers more aware of their energy use	- Could be relatively inefficient, as subsidy only loosely related to carbon saving (e.g. savings could be largely on electricity which is already capped upstream)

Figure 10: Options for raising subsidies

Options	Strengths	Weaknesses
General taxation	- Equitable/means tested - Delivering public good - Government leadership	- Competing priorities for funds - No link to energy / carbon - Lack of transparency - May be unpopular with consumers
Green / carbon tax or hypothecated tax (e.g. EU ETS auctions)	- Transparent - Discourages negative behaviours - Delivering public good - Government leadership	- Seen as additional - Complex to apply - No certainty of outcome (i.e. whether sufficient funds be raised)
Property / council tax	- Linked to the property	- Lack of transparency - Not based on ability to pay - May be unpopular with consumers
Obligation (e.g. on energy companies)	- Efficient as companies ensure that just enough funding is raised - Flexibility in when and how funds are raised	- Lack of transparency - Not based on ability to pay - No link to energy / carbon
Levy on energy bills / consumption	- Greater transparency for consumers - Could be linked to energy consumption so penalising worst performers and rewarding best	- Difficult to ensure the right level of funds are raised - Not based on ability to pay
Service charge on regulated utilities (e.g. DNOs)	- Transparency on the level of funds raised	- Difficult to ensure the right level of funds are raised - Not based on ability to pay

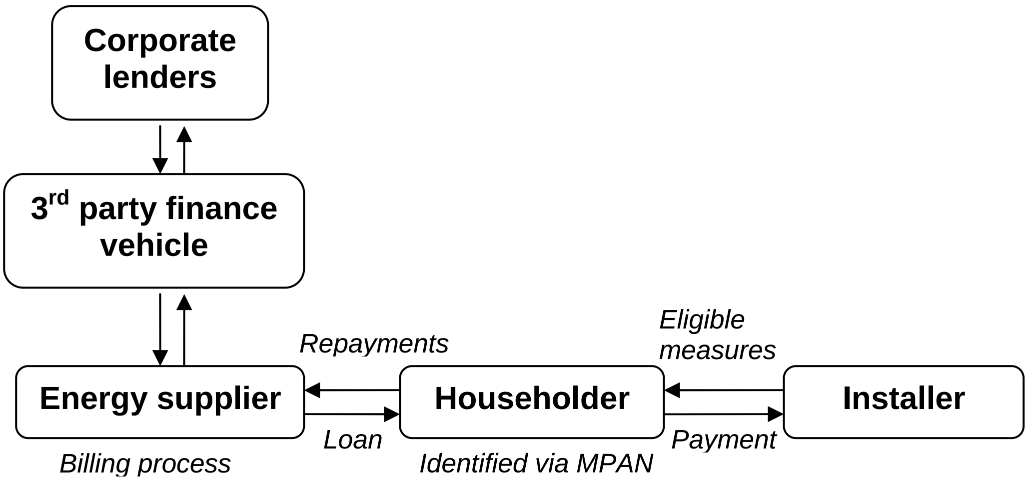
Figure 11: Diagrams of possible billing models for PAYS

Commercial model



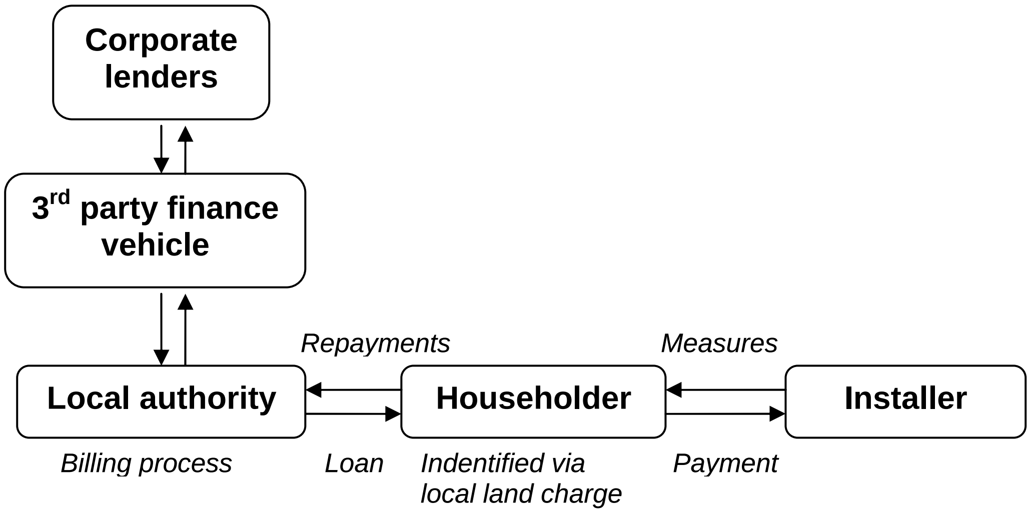
This includes unsecured, secured and/or government backed loans for energy saving measures. In order for the savings on energy bills to compensate for loan repayments, the loan term needs to be sufficiently long and the interest rate low, therefore, a secured loan such as a second charge mortgage may be preferable.

Energy supplier model



Energy suppliers would administer loans offered by the financial sector, which could be linked to the property via the MPAN (meter point administration number). The charge could be recouped as an additional line on existing energy bills. Suppliers may also take on responsibility for debt recovery, with enforcement via smart pre-payment meters and service disconnection if necessary.

Local authority model



Local authority model – local authorities would administer loans offered by the financial sector possibly via arrangements with central Government, which could be linked to the property via a local land charge and billed in a similar way to council tax. Local authorities would be responsible for debt recovery, with enforcement through the courts.

Figure 12: Strengths and weaknesses of possible PAYS models

Models	Strengths	Weaknesses
Commercial	- Financial institutions experienced at providing loans - Low administrative complexity and costs - Unlikely to require legislative changes	- May be difficult to offer attractive interest rates, unless loan secured and/or government backed - Does not ensure access to finance for all consumers as those with poor credit ratings would not be offered loans - Asset seizure is problematic (e.g. cavity wall insulation) although repossession could be a method of security - Difficult to show energy savings against repayments on a single bill - Loan paid off on sale of property, therefore important to ensure energy performance improvements are reflected in its value - Does not address landlord-tenant split issues
Energy supplier	- Suppliers can offer bespoke delivery and financing packages to consumers - May be possible to show energy savings against repayments on a single bill - Suppliers will have access to real energy data which will make it easier to evaluate how well the model is working - Energy suppliers have existing billing systems in place - Economies of scale in terms of administrative costs - Debt recovery via electricity / gas disconnection needs to be proportionate to the likely loan amount	- If charge displayed on electricity bill then may not see savings, as these are likely to be mainly on heating fuel – could result in increase default risk - Difficulties in recovering debt - for non-energy debt it is not currently possible disconnect for non-payment or recover debt through pre-payment meters - Complications around supplier switching, particularly if some suppliers unwilling to take on loan - Legislative changes may be necessary – to enable robust system of debt recovery and link to property via MPAN - Additional layers of administrative complexity (e.g. process for supplier switching, linking to a property) - Cost of changing billing systems - Need a clear process for allocating partial payments for bills between energy costs and loan charge

Local authority	- Relatively straight forward to link charge to property as local authorities have a long-term association with properties - Strong record on debt recovery therefore lower risk and able to offer low interest rates - Can offer loans to all rather than only those with good credit ratings - Easier to identify vulnerable people and offer them packages which include additional financial support - Local authorities have existing billing systems in place	- Debt recovery through the courts and ultimately repossession does not appear to be proportionate to the likely loan amount - Legislative changes may be required with respect to local authority duties - High administrative costs, possible duplication of effort and variability of service, particularly if every local authority develops its own offering - More difficult to show energy savings against repayments on a single bill - Limited access to real energy data, therefore, more difficult to evaluate how well the model is working - Government/local authority borrowing may be on balance sheet - Costs and difficulties involved in changing billing systems. - Not all consumers receive council tax bills (e.g. those on certain benefits)

Appendix D – Working Group

UKBCSE Energy Demand Working Group members:

Sara Vaughan	Chair of the UKBCSE Energy Demand Working Group, and Director of Regulation & Energy Policy, E.ON UK
Graham Kirby	Retail Regulation Manager, E.ON UK
Chris Harris	Head of Retail Regulation, RWE npower
Rob Knight	Energy Services Policy Manager, RWE npower
José Davila	Head of Strategy & Communications, British Gas New Energy
Chetan Lad	Strategy Manager, British Gas New Energy
Claire Stubbs	Energy Policy Analyst – Regulation, EDF Energy
John Pietryszak	Head of Business Development, Scottish Power
Heather Watts	External Liaison Manager, Scottish Power
Rufus Ford	Policy Manager, Scottish & Southern Energy
David Pickering	Development Manager, Sustainable Gas Group, National Grid
David Green	Chief Executive, UKBCSE
Clare Dudeney	Staff lead for the UKBCSE Energy Demand Working Group, and Senior Policy Advisor, UKBCSE
Judith Ward	Policy Consultant, UKBCSE
Frances Williamson	Head of Policy and External Relations, ERA