

Cambridge City Council

Energy Services Innovation  
Fund

Recommendations to incentivise  
private investment in domestic  
carbon reduction

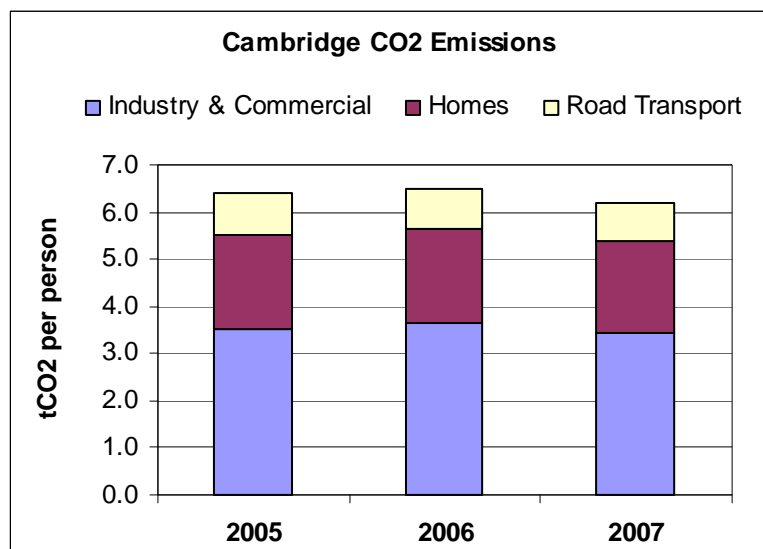
December 2009

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## 1 Introduction

Energy use in people's homes accounts for approximately one third (31%) of Cambridge City's carbon footprint, equating to approximately 2 tonnes of carbon dioxide per resident. The Cambridge Climate Change Strategy & Action Plan adopted in September 2008 details how, in order to contribute towards national and international efforts to avert the most dangerous impacts of climate change, carbon dioxide emissions in Cambridge need to reduce from 6.2 tonnes per resident in 2005 to 5.5 tonnes by 2010, 4.8 tonnes by 2020, 2.2 tonnes by 2030 and 0.7 tonnes by 2050.



Cambridge City Council has developed a strong programme of action to shift the development of Cambridge towards a low carbon future, including the securing of high sustainability standards (Code for Sustainable Homes level 5) for major new developments, launching the Cambridge Climate Change Charter with key city employers, and improving the energy efficiency of the city's housing stock by 43% since 1996. Nevertheless, the City Council recognises that much more action is required in order to achieve its ambitious carbon reduction aims.

Despite the improvements made to the energy efficiency of homes in Cambridge since 1996, 85% of private homes currently have inadequate loft insulation and 13% have none at all<sup>1</sup>. Overall, 95% of the city's private housing stock would be suitable for some form of energy efficiency improvement, and if all suitable measures were implemented this would cost £3,000 per dwelling, or £115 million in total.

Whilst the physical characteristics of Cambridge's housing stock present some challenges to improving their energy efficiency (e.g. 30% of private housing is pre 1919 requiring expensive solid wall insulation), other barriers also act as a disincentive for householders to invest in energy efficiency, including:

- high up-front costs associated with energy efficiency and renewable energy measures.
- the time taken for the cost of energy efficiency improvements to be recovered through savings on energy bills (i.e. their payback) exceeding the time people live in a property, on average 7 years, and which may not be reflected in the sale value of a property.
- low financial incentive for property landlords to invest in measures which would primarily benefit property tenants.
- lack of knowledge about which energy efficiency measures are appropriate for their home, and which companies can be trusted to install the measures at a reasonable cost.
- confusion about advice and financial support available for installing energy efficiency measures.

**Payback of Energy Efficiency Measures**

Intervention	Installation	Cost £	CO <sub>2</sub> (kg/yr)	Implementation	Payback Period - Years															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Lights- Change to CFL	DIY	0.50	11	Easy	1															
Hot Water Tank Insulation	DIY	10.00	150	Easy	1															
Hot Water Pipes – Insulate	DIY	10.00	60	Easy	1															
Double Glazing – Secondary	DIY	50.00	150	Easy	1															
Draught Proofing – Doors/Windows	DIY	100.00	150	Easy	1															
Draught Proofing – Edge of Floors	DIY	10.00	130	Easy	1															
Loft Insulation – New	DIY	200.00	1000	Easy	1															
Loft Insulation – New	Professional	300.00	1000	Easy	1															
Loft Insulation – Top-up	DIY	150.00	250	Easy	1															
Floors – Wooden	DIY	200.00	350	Medium	1															
Walls – Cavity	Professional	500.00	750	Medium	1															
Heating Controls	Professional	500.00	500	Medium	1															
Loft Insulation – Top up	Professional	250.00	250	Easy	1															
Walls Solid – Internal Insulation	Professional	2,500.00	2400	Difficult	1															
Solar Water Heating	Professional	3,500.00	750	Medium	1															
Boiler Replacement	Professional	1,500.00	1800	Medium	1															
Ground Source Heat Pump	Professional	8,000.00	1200	Difficult	1															
Air Source Heat Pump	Professional	8,000.00	1200	Medium	1															
Floor – Solid – On Slab	DIY	490.00	250	Medium	1															
Walls Solid- External Insulation	Professional	5,000.00	2600	Difficult	1															
Doors-External – Change	Professional	400.00	100	Medium	1															
Double Glazing – New Units	Professional	500.00	750	Medium	1															

**Source:** ESRC, How people use and misuse buildings, Apr 09

Financial assistance is available to householders, including from the Government's Warm Front scheme for benefit recipients, Heat Project, or Low Carbon Buildings Programme for renewable energy measures, as well as from Cambridge City Council's Home Aid

<sup>1</sup> Cambridge City Council Private Sector House Condition Survey, Nov 2009

grants. However, Cambridge City Council recognises that in order to stimulate the pace and scale of household carbon reduction required, future investment cannot rely on the provision of Government or Council grants.

Cambridge City Council is working to address all of the aforementioned barriers to improve household energy efficiency, including through development of the innovative Eastern Carbon Reduction Initiative<sup>2</sup>. The Energy Services Innovation Fund was established to specifically address the financial barriers.

## **2 Objectives of the Energy Services Innovation Fund**

In January 2009 Cambridge City Council allocated resources for the development of an Energy Services Innovation Fund (ESIF) designed to unlock the barriers hindering private investment in household carbon reduction measures. Specifically, the aim was to provide a loan for investment in carbon reduction measures attached to the property rather than the occupant and to link loan repayments to the projected energy savings in order to address the following financial barriers:

- high up-front costs associated with energy efficiency and renewable energy measures.
- investments failing to pay for themselves before an occupant moves house and which may not be reflected in the sale value of a property.
- low financial incentive for property landlords to invest in measures which would primarily benefit property tenants.

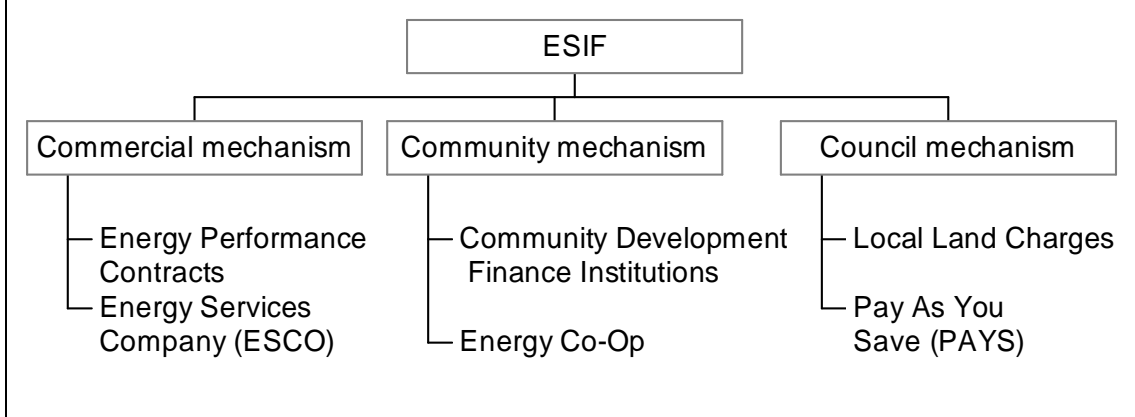
## **3 Options for designing an Energy Services Innovation Fund**

Through a series of workshops, consultation with external organisations and documentary research, Cambridge City Council identified several ways in which a local authority can stimulate investment in domestic carbon reduction, covering planning policy, procurement, investment and partnership engagement.

Appendix A summarises the findings of the ESIF documentary research undertaken, and the options identified from this research are illustrated in Figure 1.

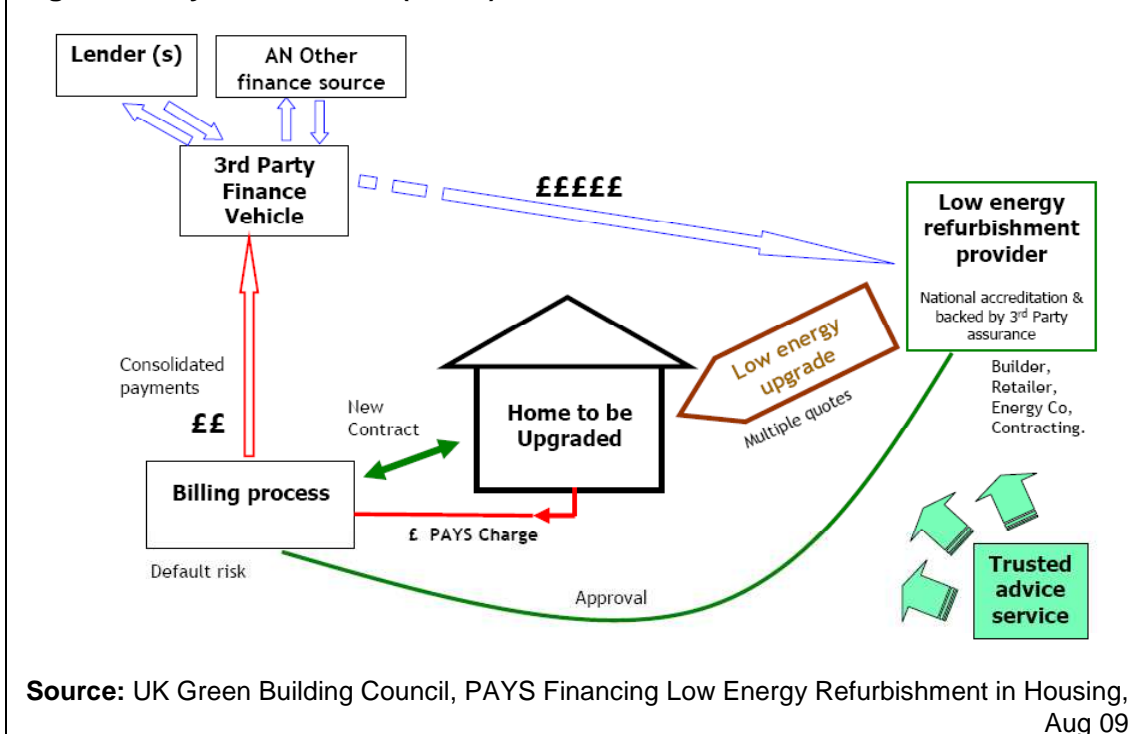
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<sup>2</sup> see [www.easterncri.org](http://www.easterncri.org)

**Figure 1: Options for designing an Energy Services Innovation Fund**

#### 4 Preferred option for an Energy Services Innovation Fund

The option in Figure 1 which was assessed to meet the objectives of the Energy Services Innovation Fund most closely was the 'Pay As You Save' (PAYS) model. This involves the establishment of a financial mechanism to raise finance, provide investment and recover debt in domestic energy efficiency and renewable energy measures, as illustrated in Figure 2

**Figure 2: Pay As You Save (PAYS) model**

Cambridge City Council could play a valuable role in delivery of a PAYS scheme by:

- securing a PAYS charge (local land charge) on a property.
- recovering loan repayments from householders through a billing system, potentially co-ordinated with Council tax.
- publicising the scheme and targeting properties which could benefit most from the service.
- co-ordinating and directing the work of private installation companies to target areas of the city.

## **5 Conclusions of researching development of an Energy Services Innovation Fund**

Despite the apparent opportunity for unlocking the financial barriers to private investment in household carbon reduction, and the legitimate role that Cambridge City Council could play in delivering this, a number of substantial barriers have been identified which prevent further development of such a scheme.

1. legal barriers associated with using land charges to attach loans to properties and recover payments using Council Tax.
2. substantial officer time and financial costs associated with contractual work and establishing administrative processes for such a scheme, which exceed the capacity of Cambridge City Council to proceed alone in the immediate future.

Whilst the Energy Saving Trust initiated a competitive application process to fund trials of different PAYS models in September 2009, this provided only for the capital costs associated with carbon reduction measures and did not directly address the legal barriers preventing Councils from developing a true PAYS scheme. This trial programme would therefore not assist Cambridge City Council to deliver its Energy Services Innovation Fund objectives.

## **6 Recommendations**

Cambridge City Council believes that the Pay As You Save model offers a substantial opportunity to unlock private investment in household carbon reduction. In order to realise this opportunity Cambridge City Council believes the following recommendations must first be implemented.

1. **PAYS Charges** – the Government must introduce legislation to enable local Councils to establish 'PAYS charges' using the local land charges system.
2. **Council tax billing** – the Government must amend Council Tax legislation to enable local Councils to use the Council tax billing system to recover PAYS loan repayments.

3. **Standard PAYS contracts & processes** – instead of providing revenue funding for numerous Councils to develop duplicate PAYS schemes, the Government should convene a working group including appropriate local government financial and legal expertise to develop standard PAYS contracts and processes that can be used by Council across the country.
4. **National Bank for Green Investment** – the Government should identify an institution to raise wholesale finance to be used for funding household carbon reduction measures, and co-ordinate with existing subsidies for carbon reduction (e.g. CERT) to ensure that total savings continue to outweigh costs.
5. **National accreditation of installers and technology** – in order to ensure appropriate customer service standards with the delivery of PAYS schemes and reassure householders of the safety, efficacy and quality of measure installed, the Government should strengthen national accreditation of installers and technologies.

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## Appendix A: Energy Services Innovation Fund documentary research

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<b>Co-Operative Party, Collective Power Energy Co-Ops Report, Sep 09</b>	Establishment of mutual energy co-operatives to: <ol style="list-style-type: none"> <li>1. purchase energy collectively</li> <li>2. collectively finance and own low carbon energy assets</li> </ol>	<ul style="list-style-type: none"> <li>• Baltimore Regional Co-operative Purchasing Committee (for public organisations)</li> <li>• New Illinois Co-operative Energy (for residential members)</li> <li>• Energy4All (mainly community ownership of wind farms)</li> <li>• Torrs hydro (community ownership of 1 micro-hydro project in East Mids).</li> <li>• Community Renewable Energy (CoRE) (helps community groups to establish joint ventures and co-ops in the NE funded by RDA &amp; EU).</li> </ul>	<ol style="list-style-type: none"> <li>1. Propose establishment of a Govt 'community energy &amp; climate change unit', based on the successful (football) Supporters Direct model, to provide:               <ul style="list-style-type: none"> <li>• business planning</li> <li>• energy market intelligence</li> <li>• legal support</li> <li>• financial support</li> <li>• training.</li> </ul> </li> <li>2. Alternative funding instrument to equity investment for mutuals based on permanent interest bearing shares (PIBS) to enable energy co-ops to raise risk capital from the community.</li> </ol>	<ol style="list-style-type: none"> <li>1. Energy contracts – potential for collective energy purchasing.</li> <li>2. Planning Policy – potential preferences for energy infrastructure which includes element of community ownership?</li> <li>3. Investment in third party community energy co-op?</li> </ol>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<b>Energy Efficiency Partnership for Homes (EEPH) Finance Mechanisms Workshop Report, May 09</b>	Workshop to identify, assess and agree options for financing domestic carbon reduction targeted at the following groups: <ol style="list-style-type: none"> <li>1. <u>high income owner-occupiers</u> – standard type of loan.</li> <li>2. <u>low income owner-occupiers</u> – PAYS delivered by energy companies.</li> <li>3. <u>social landlord major stock refurb</u> – ESCO (RSLs prevented from recovering investment through higher rents).</li> <li>4. <u>private landlords with few properties</u> – carrot &amp; stick approach, including linking CTax to EPC ratings.</li> </ol>	None.	<ul style="list-style-type: none"> <li>• Several options rely on introduction of Feed In Tariffs and Renewable Heat Incentives.</li> <li>• Doesn't seem to address bad debt risk associated with low income owner-occupiers.</li> <li>• Energy companies &amp; DNO's currently not interested in PAYS – need to improve business case.</li> <li>• Substantial marketing and householder education.</li> </ul>	Proposals overall include limited role for Councils – list of delivery agents doesn't mention Councils. <ol style="list-style-type: none"> <li>1. ESCO partner covering Council housing.</li> <li>2. PAYS proposals rely on property charges – likely to be local rather than Land Registry.</li> </ol> Proposals that were most developed relate to commercial mechanisms delivered by commercial operators. Proposals related to Councils not well developed.
<b>EST, Power in Numbers - Benefits &amp; potential of</b>	Doesn't directly address financial mechanisms, but concludes that community scale energy	<ul style="list-style-type: none"> <li>• Wind turbine co-operatives</li> <li>• Community heating in Denmark and the UK</li> <li>• Biomass heating in Spain</li> </ul>	The report identifies 14 non-technical barriers to the establishment of community scale energy projects, 3 of which	Cambridge City Council can take action in the following areas to promote community scale energy

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<b>distributed energy generation at the small community scale, Nov 08</b>	generation and distribution (CHP in urban areas, incl. biomass) offers a more cost effective method of energy generation and carbon reduction.	<ul style="list-style-type: none"> <li>• Solar district heating in Friedrichshafen, Germany</li> <li>• Ground Source Heat Pumps in Cornwall</li> <li>• Small-scale hydro electricity in New Mills, Derbyshire</li> </ul>	<p>(underlined) relate directly to the objectives of the ESIF.</p> <ol style="list-style-type: none"> <li>1. Awareness of the benefits of community energy systems</li> <li>2. Working together as a community (integrating a diverse consumer base)</li> <li>3. Importance of a community champion</li> <li>4. Time and skills shortages within communities</li> <li>5. Need for specialist advice</li> <li>6. Lack of best practice and 'off the shelf' models for community organisation</li> <li>7. Planning and other permitting – high cost at risk</li> <li>8. <u>Absence of a real economic driver for community energy</u></li> <li>9. <u>Financing for community energy projects</u></li> <li>10. <u>Difficulties in ongoing billing and management of the system</u></li> <li>11. Reluctance from grid operators</li> <li>12. Need for independent data on technologies</li> <li>13. Maintenance, replacement</li> </ol>	<p>projects:</p> <ul style="list-style-type: none"> <li>• Planning policy – development of offset mechanism to allow near-site and off-site carbon reduction measures, related offset fund, and requirements for connecting to district heating.</li> <li>• Anchor loads – pools, leisure centres, sheltered housing provide ideal heat demand to make urban CHP viable.</li> <li>• Partnerships – Council can play a role in bringing together broad range of partners necessary to provide finance, technology, demand, etc.</li> <li>• Financing – beyond direct capital investment, or joint venture ESCo, the ESIF aims to establish whether the Council</li> </ul>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
			and system failure 14. The importance of concerted local political will	could have a revenue/billing role.
<b>Existing Homes Alliance, Paying For It, May 09</b>	<p>Evaluates 8 mechanisms from around the world for promoting investment in domestic carbon reduction and scores 3 highly for application in the UK:</p> <ul style="list-style-type: none"> <li>• The German DENA/KfW scheme</li> <li>• Pay as You Save scheme: Knauf proposal</li> <li>• Mortgage further advance with grant</li> </ul>	<ol style="list-style-type: none"> <li>1. The German DENA/KfW scheme</li> <li>2. The Heat and Energy Saving Consultation ESCo proposals</li> <li>3. Pay as You Save scheme: Knauf proposal</li> <li>4. Mortgage further advance with grant</li> <li>5. The Kirklees RE-Charge scheme</li> <li>6. Australian Green Loans scheme</li> <li>7. New Zealand scheme</li> <li>8. French loans scheme</li> </ol>	<ul style="list-style-type: none"> <li>• Interest of commercial mortgage providers.</li> <li>• property valuations better reflect energy performance.</li> <li>• Property valuations already stretch LTV ratios.</li> </ul>	<ul style="list-style-type: none"> <li>• Local co-ordination and publicity would be primary role for the Council with roll-out of the German or mortgage-based models.</li> <li>• PAYS model – see below: UKGBC, PAYS Financing Low Energy Refurbishment in Housing, Aug 09</li> </ul>
<b>Forum for the Future, Smarter Finance, Jun 09</b>	<p>Explains different ways to raise finance and models to maximise its efficient use, drawing on examples, to identify 10 success factors.</p> <p>Profiles the Climate Finance initiative as a way for Councils to</p>	<ol style="list-style-type: none"> <li>1. Aberdeen Heat &amp; Power (ESCO part owned by Aberdeen Council).</li> <li>2. Berlin Energy Agency</li> <li>3. Carbon Trading Yorkshire</li> <li>4. Eastleigh CarbonFREE</li> <li>5. Kirklees RE-Charge</li> <li>6. Lithuania Energy Efficiency and Housing Project</li> <li>7. Milton Keynes Carbon</li> </ol>	<p>Dependent on which model is pursued, but report identifies 10 success factors.</p> <ul style="list-style-type: none"> <li>• Leadership and vision</li> <li>• Imagination and creativity</li> <li>• Strategy</li> <li>• Joined-up working</li> <li>• Engagement with stakeholders</li> </ul>	<p>Some of the examples listed are already being pursued by Cambridge City Council:</p> <ul style="list-style-type: none"> <li>• Offset fund &amp; mechanism being developed with Cambs Horizons (building on MK experience).</li> <li>• Car clubs, charging</li> </ul>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
	develop these mechanisms themselves.	Offset Fund 8. Thamesway Energy Ltd (Woking joint venture ESCo). 9. Wessex Ecos Fund 10. Woking Borough Council Sustainable Transport	<ul style="list-style-type: none"> <li>• Partnerships</li> <li>• Research and development</li> <li>• Long-term view</li> <li>• Blended outcomes</li> <li>• Governance and audit</li> </ul>	points, emissions based charging (Woking Sustainable Transport). <ul style="list-style-type: none"> <li>• Establishment of an infrastructure based ESCo (as in Aberdeen or Woking) is being pursued for the growth areas with Horizons.</li> </ul>
<b>LGA, Energy Generating Democracy, Oct 08</b>	Proposes a national energy loans fund that offers home-owners interest-free loans, backed by a second charge on their property, repayable when the home is sold, to install renewable energy technologies or in homes unsuitable for cheaper cavity wall insulation to finance energy efficiency measures.	<ul style="list-style-type: none"> <li>• Kirklees RE-Charge Scheme</li> </ul>	<ul style="list-style-type: none"> <li>• National Government agrees to establish such a fund.</li> </ul>	Working with local partners (esp. EST), Councils would provide: <ul style="list-style-type: none"> <li>• targeting</li> <li>• regular and extensive contacts with residents</li> <li>• trust</li> <li>• local knowledge</li> <li>• scale</li> </ul>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<p><b>London Energy Partnership, Making ESCOs Work, Feb 07</b></p>	<p>Provides examples and scopes the regulatory issues involved with setting up an energy services company (ESCO) in London, with specific reference to four pilot Energy Action Areas (EAAs).</p> <p>However, does not provide any specific proposals or recommendations regarding how to proceed.</p> <p>Largely focuses on infrastructure based energy projects.</p>	<ul style="list-style-type: none"> <li>• Aberdeen CHP Scheme/ Wick District Heating Scheme</li> <li>• Millbrook Combined Heat and Power and District Heating Scheme, Southampton</li> <li>• Southampton Geothermal Heating Company Limited/ Barkantine Heat and Power Company</li> <li>• Woking Borough Council</li> <li>• Titanic Mill, West Yorkshire - Mill Energy Services Limited</li> <li>• London Climate Change Agency (LCCA)</li> <li>• Berlin Energy Agency</li> <li>• Toronto Better Buildings Partnership &amp; Toronto Atmospheric Fund</li> <li>• Australian energy performance contracting</li> <li>• Danish CHP</li> </ul>	<ul style="list-style-type: none"> <li>• New build or refurb capital projects of sufficient scale to generate ...</li> <li>• financial incentive / return on investment</li> <li>• partnership interest.</li> </ul>	<p>All of the options outlined in the report are at a scale above that which can be achieved through the ESIF, but could involve:</p> <ul style="list-style-type: none"> <li>• Cambridgeshire Climate Change Agency (with similar structure and purpose to the LCCA or Berlin Agency).</li> <li>• Council as ESCo partner (&lt;20%) in city project.</li> <li>• Energy Performance Contract – internally focussed which doesn't fit with ESIF aims.</li> </ul>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<b>UKGBC, PAYS Financing Low Energy Refurbishment in Housing, Aug 09</b>	<p>Proposes a Pay As You Save (PAYS) mechanism involving:</p> <ul style="list-style-type: none"> <li>• wholesale finance raised by national Govt and managed by a '3<sup>rd</sup> party Finance Vehicle'.</li> <li>• Low energy refurbishment provider identifies and installs measures, up to £10k funded by '3<sup>rd</sup> party Finance Vehicle' loan augmented by grants e.g. CERT.</li> <li>• local land charge attaches debt to the property rather than the householder.</li> <li>• debt repayments linked to energy savings and recovered over 25 years through Council billing.</li> <li>• Council repays '3<sup>rd</sup> party Finance Vehicle'.</li> </ul>	<p>None. Presents scenarios for how this approach would apply to:</p> <ul style="list-style-type: none"> <li>• Refurb of existing property.</li> <li>• Social housing.</li> <li>• Private rented.</li> <li>• New build.</li> </ul>	<ul style="list-style-type: none"> <li>• Primary legislation to enable local land charges to be used for this purpose, monthly billing, administration and enforcement powers.</li> <li>• Market research and testing.</li> <li>• Interested finance and installer partners.</li> <li>• Development of standards and accreditation for installers (EST lead?).</li> </ul>	<ul style="list-style-type: none"> <li>• Local land charges.</li> <li>• Billing mechanism.</li> <li>• Co-ordination of scheme locally: promotion and advice provision; identify opportunities; signposting to registered installers, integration with other schemes (e.g. Comfort Zones, Warm Front, Landlord Accreditation Scheme) and planning &amp; building control.</li> </ul>

Document	Proposals	Examples	Pre-requisites	Cambridge City Council role
<b>Wessex Reinvestment Trust, Financial Mechanisms Project Final Report, Jan 08</b>	Proposes Industrial & Provident Societies (IPS) as the most cost-effective Community Development Finance Institution (CDFI) for projects addressing: <ul style="list-style-type: none"> <li>• social enterprise investment</li> <li>• community asset ownership</li> </ul> involving: <ul style="list-style-type: none"> <li>• 'blended value' / social return</li> <li>• 'slow money'.</li> </ul>	<ul style="list-style-type: none"> <li>• Ecos Fund (green homes developer).</li> <li>• Local Food Links (West Dorset)</li> <li>• High Street Organics (Bruton, Somerset).</li> <li>• Water Power Enterprises (h2oPE) and Torrs Hydro New Mills Ltd.</li> </ul>	<ul style="list-style-type: none"> <li>• Doesn't directly resolve the barriers hindering further development of the ESIF.</li> <li>• Requires community groups / social enterprises being willing and able to adopt this approach.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited role in addressing ESIF objectives – primarily an alternative way to raise investment finance with greater local &amp; social return.</li> <li>• Partnerships e.g. if Cambridge City's Home Aid provision were to be outsourced and extended across Cambs, an IPS would be a useful mechanism to adopt.</li> <li>• Asset transfer to community ownership e.g. existing commercial property portfolio.</li> </ul>